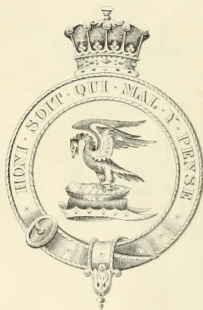


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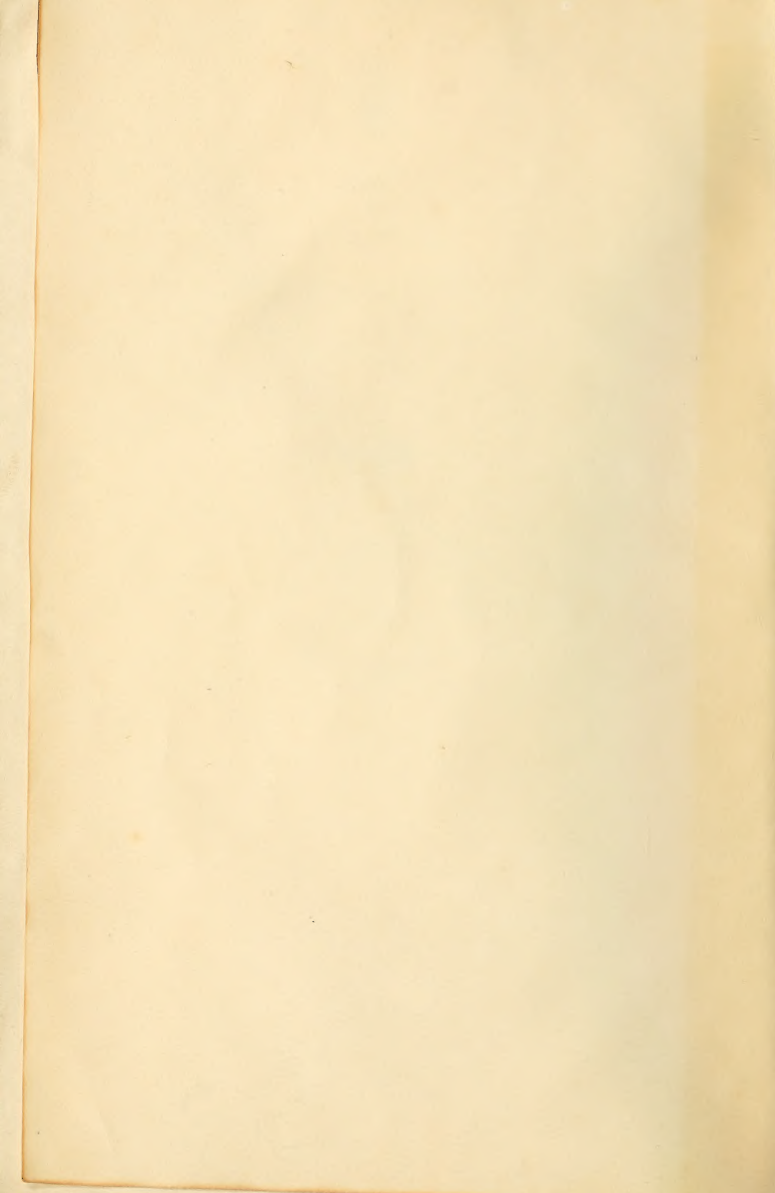
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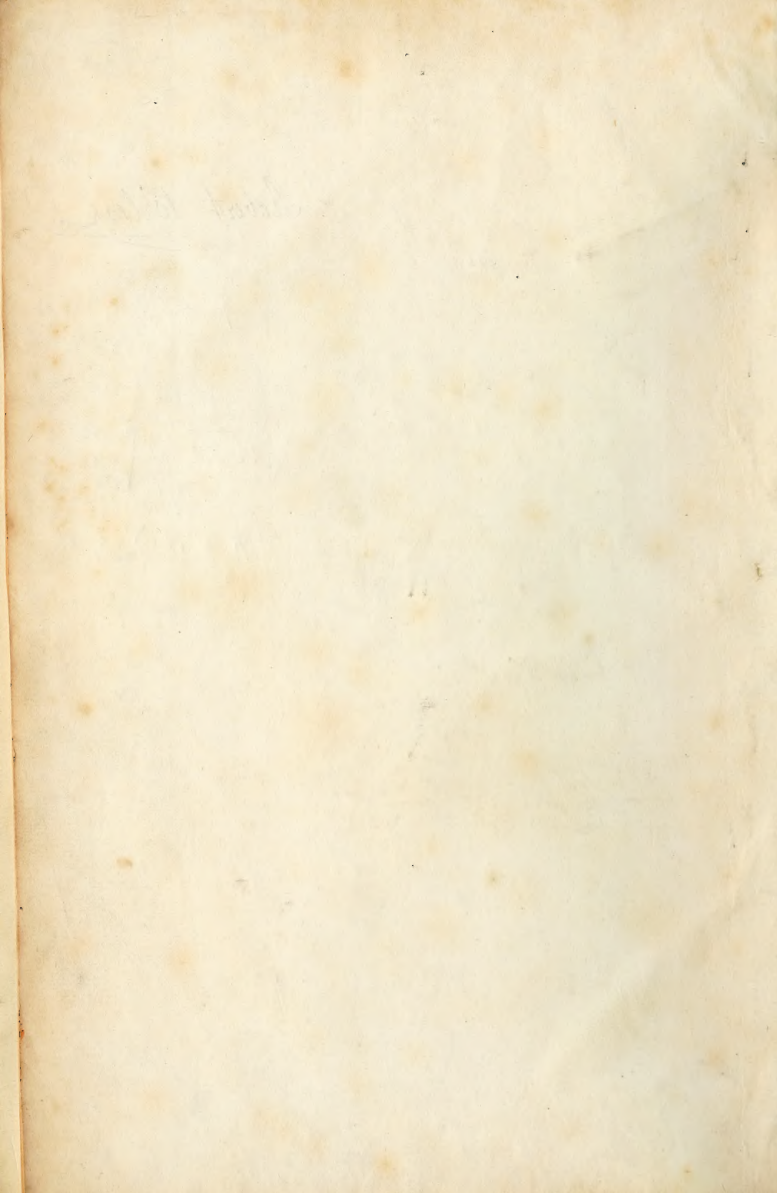
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Et vidit Deus lucem

quod esset bona.



SYLVA SYLVARVM

or

A NATURAL HISTORY

In ten Centuries.

Written by the right Hon^{ble} Francis

Le Verulam Viscount S^t Alban.

Published after y^e Autho^rs Death

by W. RAWLEY D^r of Divi-
nity &c

Tho. Cressall sculp

LONDON

*Printed for W. Lee and are to be sold at
the Great Turke head next to the Mytne
Tawne in Fleetstreet*

Anno

1627

1100 +



TO THE MOST HIGH
AND MIGHTY PRINCE
CHARLES,
BY THE GRACE OF GOD,
King of *Great Britaine, France, and*
Ireland, Defender of the Faith, &c.

May it please your most Excellent Maiestie;



He whole Body of the *Natu-
rall Historie*, either designed,
or written, by the late *Lo.
Viscount S. Alban*, was dedica-
ted to your *Maiestie*, in his
Booke De Ventis, about foure
yeeres past, when your *Maiestie* was *Prince*: So
as there needed no new Dedication of this
Worke, but only, in all humbleness, to let your
Maiestie know, it is yours. It is true, if that *Lo.*
had liued, your *Maiestie*, ere long, had beene
inuoked, to the Protection of another *Historie*;
Whereof,

The Epistle Dedicatory.

Whereof, not *Natures Kingdome*, as in this, but these of your *Maiesties*, (during the Time and *Raigne* of *King Henry the Eighth*) had beene the Subiect: Which since it died vnder the Designation meereley, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to haue parted, for a while, with his Darling *Philosophie*, that hee might haue attended your Royall Commandement, in that other *Worke*. Thus much I haue beene bold, in all lowlinesse, to represent vnto your *Maiestie*, as one that was trusted with his *Lordships Writings*, euen to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*, So vnder the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence; And to offer it vp into your *Sacred Hands*.

Your *MAIESTIES* most Loyall
and Deuoted Subiect,

W. RAWLEY.

SYLVA
SYLVARVM:

libro OR *Howard*
A Naturall Historie.

IN TEN CENTURIES.

WRITTEN BY THE RIGHT
Honourable FRANCIS Lo. Verulam
Viscount St. ALBAN.

Published after the Authors death,
By WILLIAM RAWLEY Doctor of Divinitie,
late his Lordships Chaplaine.



LONDON,
Printed by J. H. for William Lee at the Turkes
Head in Fleet-street, next to the Miter. 1627.





To the Reader.



Having had the Honour to be continually with my *Lord*, in compiling of this *Worke*; And to be employed therein; I haue thought it not amisse, (with his Lordships good leaue and liking,) for the better satisfaction of those that shall reade it, to make knowne somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I haue heard his Lordship often say; that if hee should haue serued the glory of his owne Name, he had been better not to haue published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot haue that Lustre, which Bookes cast into Methods haue: But that he resolved to preferre the good of Men, and that which might best secure it, before any thing that might haue Relation to Himselfe. And hee knew well, that ther was no other way open, to vnloose Mens mindes, being bound; and (as it were) Maleficate, by the Charmes of deceiuing Notions, and Theories; and therby made

To the Reader.

Impotent for Generation of VVorkes; But onely
no wher to depart from the Sense, and cleare ex-
perience; But to keepe close to it, especially in the
beginning: Besides, this *Naturall History* was a
Debt of his, being Designed and set downe for a
third part of the *Instauration*. I haue also heard
his Lordship discourse, that Men (no doubt)
will thinke many of the *Experiments* contained in
this Collection, to bee Vulgar and Triuiall;
Meane and Sordid; Curious and Fruitleffe: And
therfore he wisheth, that they would haue perpe-
tually before their Eyes, what is now in doing;
And the Difference betweene this *Naturall Hi-
story*, and others. For those *Naturall Histories*,
which are Extant, being gathered for Delight and
Vse, are full of pleasant Descriptions and Pictures;
and affect and seeke after Admiracion, Rarities,
and Secrets. But contrariwise, the Scope which
his Lordship intendeth, is to write such a *Natu-
rall History*, as may be Fundamentall to the Ere-
cting and Building of a true *Philosophy*: For the
Illumination of the *Vnderstanding*; the Extracting
of *Axiomes*; and the producing of many Noble
Works, and *Effects*. For he hopeth, by this meanes,
to acquit Himselfe of that, for which hee taketh
Himselfe in a sort bound; And that is, the Ad-
uancement of all Learning and Sciences. For ha-
uing in this present VVorke Collected the Ma-
terialls for the Building; And in his *Novum
Organum* (of which his Lordship is yet to publish
a Second

a Second Part,) set downe the Instruments and Directions for the Worke; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalfe, I haue heard his Lordship speake complainingly; That his Lordship (who thinketh hee deserueth to be an Architect in this building,) should be forced to be a VVork-man and a Labourer; And to digge the Clay, and burne the Brick; And more then that, (according to the hard Condition of the *Israhelites* at the latter end) to gather the Strawe and Stubble, ouer all the Fields, to burn the Bricks withall. For he knyweth, that except hee doe it, nothing will be done: Men are so sett to despise the Meanes of their owne good. And as for the *Basenes* of many of the Experiments; As long as they be Gods VVorks, they are Honourable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plaine Experience, and not from doubifull; And his Lordships course is, to make VVonders Plaine, and not Plaine things VVonders; And that Experience likewise must be broken and grinded, and not whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kinde of Experiments; *Experimenta Fructifera*, and *Experimenta Lucifera*: Experiments of *Vse*, and Experiments of *Light*; And he reporteth himself, whether he were not a strange Man, that should thinke that

To the Reader.

Light hath no Vse, because it hath no Matter. Further, his Lordship thought good also, to add vnto many of the *Experiments* themselues, some *Glosse* of the *Causes*; that in the succeeding work of *Interpreting Nature*, and *Framing Axiomes*, all things may be in more Readines. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himselfe, they are farr more certaine, then those that are rendred by Others; Not for any Excellency of his owne *Witt*, (as his Lordship is wont to say) but in respect of his continuall Conuersation with *Nature*, and *Experience*. He did consider likewise, that by this Addition of *Causes*, Mens mindes (which make so much hast to find out the *Causes* of things;) would not think themselues vtterly lost, in a Vast *Woods* of *Experience*, but stay vpon these *Causes*, (such as they are) a little, till true *Axiomes* may be more fully discovered. I haue heard his Lordship say also, that one great Reason, why he would not put these Particulars into any exact *Method*, (though he that looketh attentiuely into them, shall finde that they haue a secret Order) was, because hee conceiued that other men would now thinke, that they could doe the like; And so goe on with a further Collection: which if the *Method* had been Exact, many would haue despaired to attaine by Imitation. As for his Lordships loue of Order, I can referr any Man to his Lordships Latine Booke, *De Augmentis Scientiarum*;
which

To the Reader.

which (if my Iudgment be any thing) is written in the Exactest Order, that I know any Writing to bee. I will conclude with an vsuall Speech of his Lordships. That this Worke of his *Naturall History*, is the *World*, as G O D made it, and not as Men haue made it ; For that it hath nothing of Imagination,

This Epistle is the same, that should haue been prefixed to this Booke, if his Lordship had liued.

W: Rawley.



NATVRALL HISTORIE.

I. Century.

DIGG a *Pitt* vpon the *Sea shore*, somewhat aboue the High-water Marke, and sincke it as deepe as the Low-Water marke; And as the *Tide* commeth in, it will fill with *Water*, Fresh and Potable. This is commonly practized vpon the Coast of *Barbary*, where other fresh *Water* is wanting. And *Cæsar* knew this well, when he was besieged in *Alexandria*: For by Digging of *Pitts* in the *Sea shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea-Water* vpon the Wells of *Alexandria*; And so saued his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For he thought that all *Sea-Sandes* had Natural Springs of *Fresh Water*. But it is plaine, that it is the *Sea-Water*; because the *Pitt* filleth according to the Measure of the *Tide*: And the *Sea water* passing or Straying through the Sandes, leaueth the Saltneffe.

I remember to haue Read, that Triall hath beene made of *Salt Water* passed through *Earth*; through Tenn Vessells, one within an other, and yet it hath not lost his Saltneffe, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt Water* drained through twenty Vessells, hath become Fresh. This *Experiment* seemeth to crosse that other of *Pitts*, made by the *Sea side*; And yet but in part, if it be true, that twentie Repetitions doe the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, ther is no small difference betweene a

Passage

I

Experiments
in Conser-
uatiue, touch-
ing the
Straining and
Passing of Bo-
dies, one
through ano-
ther: which
they Call *Per-
colation*.

2

Passage of *Water* through twenty small Vessells; And through such a distance, as betweene the Low water, and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the *Water* so finely, as Sand doth. But ther is a Third Point, that I suspect as much, or more, then the other Two: And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pitts*, the *Water* riseth; But in the *Experiment* of *Transmission* of the *Water* through the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted throughour) goeth to the Bottom. And therefore no meruaile, if the Draining of *Water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the very Dashing of the *Water*, that commeth from the Sea, is more proper to strike of the Salt part, then wher the *Water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*;) is a good kinde of *Separation*; Not onely of Thicke from Thin; and Grosse from Fine; But of more subtile Natures; And varieth according to the Bodie through which the *Transmission* is made. As if through a wollen Bagg, the Liquour leaueth the Fatnesse; It through Sand, the Saltnesse; &c. They speake of Seuering Wine from *Water*, passing it through Iuy wood, or through other the like porous Body; But *Non Constat*.

4 The *Gumm* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Bark. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent then *Gumms*) are the fine Exudations of *Stone*.

5 *Aristotle* giueth the Cause, vainely, why the *Feathers* of *Birdes* are of more lively Colours, then the *Haires* of *Beastes*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunn, then *Beasts*; But that is manifestly vntrue; For *Cattle* are more in the Sun then *Birds*, that liue commonly in the Woods, or in some Couert: The true Cause is, that the Excrementious Moisture of liuing Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, then it doth in *Beasts*: For *Feathers* passe through *Quills*; And *Haire* through *Skin*.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleauing Body is Mixed and Agitated with the *Liquours*; wherby the grosser Part of the *Liquor* sticks to that Cleauing Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries* clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whites of Eggs, gather all the Dreggs and grosser Parts of the Iuyce to them; And after the *Sirrupe* being sett on the Fire, the whites of Eggs themselves harden, and are

are taken forth. So *Ippocrasse* is clarified by mixing with Milke; And stirring it about; And then passing it through a Wollen Bagge, which they call *Hippocrates Sleeve*: And the Cleauing Nature of the Milke draweth the Powder of the Spices, and Groſſer parts of the *Liquour* to it; And in the passage they stick vpon the Woollen Bagge.

The *Clarifying* of *Water*, is an *Experiment* tending to Health; besides the pleasure of the Eye, when *Water* is Crystalline. It is effected by casting in and placing Pebbles, at the Head of a Current; that the *Water* may straine through them.

It may be, *Percolation* doth not onely cause Clearenesse and Splendour, but Sweetnes of Sauour; For that also followeth, as well as Clearenes, when the Finer Parts are seuered from the Groſſer. So it is found, that the Sweates of Men that haue much Heat, and exercise much, and haue cleane Bodies, and fine Skins, doe smell sweet; As was said of *Alexander*; And we see, commonly, that *Gumms* haue sweet Odours.

Take a *Glasſe*, and put *Water* into it, and wett your Finger, and draw it round about the Lipp of the Glasſe, preſſing it ſomewhat hard; And after you haue drawne it ſome few times about; it will make the *Water* friſke and ſprinkle vp, in a fine Dew. This *Iſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Solid Body. For whenſoeuer a Solid Body (as Wood, Stone, Metall, &c.) is preſſed, ther is an inward Tumult in the parts therof; ſeeking to deliuer themſelues from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherin it is ſtrange in the higheſt Degree, that this *Motion* hath neuer been obſerued, nor inquired; It being of all *Motions*, the moſt Common, and the Chiefe Roote of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Prooſe, and Search, which way to deliuer it ſelfe; And then worketh in Progreſſe, wher it findeth the Deliuerance eaſieſt. In *Liquours* this *Motion* is viſible: For all *Liquours* ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not,) it is ſo ſubtile, as it is inuiſible; But neuertheleſ bewrayeth it ſelfe by many Effects; As in this *Iſtance* wherof we ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better vnto the Lipp of the *Glasſe*;) after ſome continuance, putteth all the ſmall Parts of the *Glasſe* into worke; that they ſtrike the *Water* ſharpeſly; from which *Percuſſion* that Sprinkling commeth.

If you ſtrike or pierce a *Solid Body*, that is brittle, as *Glasſe*, or *Sugar*, it breaketh not onely, wher the immediate force is; but breaketh all about into ſhauers and fitters; The *Motion*, vpon the *Preſſure*, ſearching all wayes; and breaking wher it findeth the *Body* weakeſt.

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *Compreſſion*; Moueth likewiſe in round, (The *Flame* being in the Nature of a *liquid Body*;) Sometimes recoyling; Sometimes breaking the *Piece*;

B

But

Experiments
in Conſort
touching *Motion* of Bodies
vpon their
Preſſure.

7

8

9

10

11

But generally discharging the *Bullet*, because ther it findeth easiest De-
liverance.

12

This *Motion* vpon *Pressure*, and the Reciprocall therof, which is
Motion vpon *Tensure*; we vse to call (by one common Name) *Moti-*
on of Libertie; which is, when any *Body*, being forced to a *Preier-Natu-*
rall Extent, or Dimension, deliuereth and restoreth it selfe to the Na-
turall: As when a *Blowne Bladder* (Pressed) riseth againe; or when
Leather or *Cloth* tentured spring backe. These two *Motions* (of which
ther be infinite Instances,) we shall handle in due place.

13

This *Motion* vpon *Pressure* is excellently also demonstrated in *Sounds*;
As when one Chimeth vpon a *Bell*, it foundeth; But as soon as he layeth
his hand vpon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall*
String, as soone as the *Quill* of the sack falleth vpon it, stoppeth. For
these *Sounds* are produced, by the subtile Percussion of the Minute
parts, of the *Bell*, or *String*, vpon the *Aire*; All one, as the *Water* is
caused to leape by the subtile Percussion of the Minute parts of the
Glasse, vpon the *Water*, wherof we spake a little before in the 9th.
Experiment. For you must not take it to be, the locall *Shaking* of the
Bell, or *String*, that doth it. As we shall fully declare, when we come
hereafter to handle *Sounds*.

Experiments
in *Consort*, tou-
ching *Sepa-*
rations of *Bo-*
dies by *Weight*

14

TAKE a *Glasse* with a *Belly* and a long *Nebb*; fill the *Belly* (in part)
with *Water*: Take also another *Glasse*, whereinto put *Claret Wine*
and *Water* mingled; Reverse the first *Glasse*, with the *Belly* vpwards,
Stopping the *Nebb* with your finger; Then cipp the Mouth of it with-
in the Second *Glasse*, and remoue your Finger: Continue it in that
posture for a time; And it will vnmingle the *VVine* from the *Water*:
The *VVine* ascending and setling in the topp of the vpper *Glasse*; And
the *VVater* descending and setling in the bottome of the lower *Glasse*.
The passage is apparent to the Eye; For you shall see the *VVine*, as it
were, in a small veine, rising through the *VVater*. For handsomnesse
sake (because the Working requireth some small time) it were good
you hang the vpper *Glasse* vpon a Naile. But as soone as ther is ga-
thered so much pure and vnmixed *water* in the Bottome of the Lower
Glasse, as that the Mouth of the vpper *Glasse* dippeth into it, the *Moti-*
on ceaseth.

15

Let the Vpper *Glasse* be *VVine*, and the Lower *VVater*; ther follo-
weth no *Motion* at all. Lett the Vpper *Glasse* be *VVater* pure, the Low-
wer *VVater* coloured; or contrariwise; ther followeth no *Motion* at all.
But it hath been tried, that though the Mixture of *VVine* and *VVater*,
in the Lower *Glasse*, be three parts *VVater*, and but one *VVine*; yet it
doth not dead the *Motion*. This *Separation* of *VVater* and *VVine* appea-
reth to be made by *Weight*; for it must be of *Bodies* of vnequall *Weight*,
or ells it worketh not; And the Heauier *Body* must euer be in the vpper
Glasse. But then note withall, that the *VVater* being made pensile, and
ther being a great *VVeight* of *VVater* in the *Belly* of the *Glasse*, sustained by

by a small Pillar of *FFater* in the Neck of the *Glasse* : It is that, which setteth the *Mallum* worke : For *FFater* and *FFine* in one *Glasse*, with long standing, will hardly seuer.

This Experiment would be Extended from Mixtures of severall *Li- quors*, to *Simple Bodies*, which Consist of severall Similare Parts : Try it therefore with *Broyne* or *Salt water*, and *Fresh water* ; Placing the *Salt water* (which is the heavier) in the vpper *Glasse* ; And see whether the *Fresh* will come about. Try it also with *FFater* thick Sugred, and *Pure water* ; and see whether the *water* which commeth about, will loose his Sweetnes : For which purpose it were good ther were a little Cock made in the Belly of the vpper *Glasse*.

16

IN *Bodies* containing Fine Spiritts, which doe easely dissipate, when you make *Infusions*, the Rule is ; A short Stay of the *Body* in the *Li- quor* receyvethe the Spiritt ; And a longer Stay confoundeth it ; be- cause it draweth forth the Earthy Part withall ; which embaseth the finer. And therefore it is an Errour in *Physicians*, to rest simply vpon the Length of stay, for encreasing the vertue. But if you will haue the *Infu- sion* strong, in those kinde of *Bodies*, which haue fine Spiritts, your way is, not to giue Longer time, but to repeat the *Infusion* of the *Body* afiner. Take *Violetts*, and infuse a good Pugill of them in a Quart of *Vineger* ; Lett them stay three quarters of an houre, and take them forth ; And refresh the *Infusion* with like quantity of new *Violetts*, se- uen times ; And it will make a *Vineger* so fresh of the *Flower*, as if a Twelve-moneith after, it be brought you in a Saucer, you shall smell it before it come at you. Note, that it smelleth more perfectly of the *Flower*, a good while after, then at first.

Experiments
in Coniunct
two fine bodi-
es, as *Li- quor*
and *Infu- sion*,
both in *Li- quors*, and
in *solids*.

17

This Rule, which wee haue given, is of singular vse, for the Prepara- tions of *Medecines*, and other *Infusions*. As for Example ; the Lease of *Burrage* hath an Excellent Spiritt, to repress the fuliginous Vapour of Dusky Melancholy, and so to cure Madnes : But neuertheless, if the Lease be infused long, it yeldeth forth but a raw substance, of no Vertue ; Therefore I suppose, that if in the Must of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* stay a small time, and be often changed with fresh ; It will make a Soueraigne Drink for Melancholy Passions. And the like I conceyne of *Orange Flowers*.

18

Rubarb hath manifestly in it Parts of contrary Operations : Parts that purge ; And parts that binde the body : And the first lay looser, and the latter lay deeper : So that if you infuse *Rubarb* for an houre, and crush it well, it will purge better, and binde the Body lesse after the purging, then if it stood twenty foure houres ; This is tried : But I conceiue likewise, that by Repeating the *Infusion* of *Rubarb*, severall times, (as was said of *Violetts*,) letting each stay in but a small time ; you may make it as strong a *Purging Medecine*, as *Scammony*. And it is not a small thing wonn in *Physick*, if you can make *Rubarb*, and other *Mede-*

19

cines that are *Benedict*, as strong Purgers, as those that are not without some Maliginity.

20

Purging Medicines, for the most part, haue their *Purgative* Vertue, in a fine Spirit; As appeareth by that they indure not boiling, without much losse of vertue. And therefore it is of good vse in *Physick*, if you can retaine the *Purging* Vertue, and take away the Vnpleasant tast of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Tast, is in the Grosser part.

21

Generally, the working by *Infusions*, is grosse and blinde, except you first try the Issuing of the seuerall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leaue that Quality, which you desire. This to know, ther be two waies; The one to try what long stay, and what short stay worketh, as hath been said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successiue, in seuerall *Liquors*. As for example; Take *Orange-Pills*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *Water*: Then take them out, and *Infuse* them againe in other *Water*; And so the third time: And then tast and consider the *First water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknes, but otherwise in Tast, or Odour; For it may bee the *First water* will haue more of the Sent, as more Fragrant; And the *Second* more of the Tast, as more bitter or Biting, &c.

22

Infusions in *Aire*, (for so we may well call *Odours*) haue the same diuersities with *Infusions* in *Water*; In that the seuerall *Odours* (which are in one Flower, or other Body) issue at seuerall times; Some earlier, some later: So we finde that *Violets*, *Woodbines*, *Strawberries*, yield a pleasing Sent, that commeth forth first; But soone after an ill Sent, quite differing from the Former; Which is caused, not so much by Mellowing, as by the late Issuing of the Grosser Spirit.

23

As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *Fire* burneth, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseeth some of his poisonous Quality, if it be vapoured out, mingled with *Spirit of Wine*, or the like: *Scum* leeseeth somewhat of his windines by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And euen in *Infusions* in things that are of too high a Spirit, you were better poure off the first *Infusion*, after a small time, and vse the latter.

Experiment
Solitary touch-
ing the Ap-
petite of Con-
tinuation in
Liquids.

24

Bubbles are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *Water* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *Water*; And when it commeth to the topp, should be staid by so weake a Couer as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is vnder the

the *Water*, that is a *Motion* of *Percussion* from the *Water*; which it selfe descending, driueth vpp the *Aire*; and no *Motion* of *Leuity* in the *Aire*. And this *Democritus* called *Motus Plaga*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the *Appetite* to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: we see it also in little Glasses of Spittle that children make of *Rushes*; And in Castles of Bubbles, which they make by blowing into *water*, hauing obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stilliades* of *water*, which if ther be *water* enough to follow, will Drawe themselves into a small thredd, because they will not discontinue; But if ther be no Remedy, then they cast themselves into round Dropps; which is the Figure, that saueth the Body most from Discontinuance: The same Reason is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise auoideth *Discontinuance*; And therefore casteth it selfe into a Round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

THE Relection, which I continually vse, of *Experiments*, (though it appeareth not) is infinit; But yet if an *Experiment* be probable in the Worke, and of great Vse, I receyue it, but deliuer it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Finde out a hanging Ground, wher ther is a good quick Fall of Raine-water. Lay a Half-Trough of Stone, of a good length, 3. or 4. foote deep within the same Ground; with one end vpon the high Ground, the other vpon the lowe. Couer the Trough with Brakes a good thicknes, and cast Sand vpon the Topp of the Brakes: You shall see, (saith he) that after some showers are past, the lower End of the Trough will runn like a *Spring* of *water*: which is no maruaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it self vpon the *Aire*, by the helpe of the Coldnesse and Condensation of the Earth, and the Consort of the first Water.

Experiment
Solitary touch-
ing the Mak-
ing of *Artifi-
ciall Springs*.

25

THE *French*, (which put off the Name of the *French Disease*, vnto the Name of the *Disease* of *Naples*;) doe report, that at the Siege of *Naples*, ther were certaine wicked Merchants, that Barrelled vpp *Mans flesh*, (of some that had been, lately slaine in *Barbary*) and sold it for *Tunny*; And that vpon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certaine, that the *Caniballs* in the *West Indies*, eate *Mans flesh*; And the *West Indies* were full of the Pockes when they were first discouered: And at this day the *Mortallest poisons*, practised by the *West Indians*, haue some Mixture of the Bloud, or Fatt, or Flesh of *Man*: And diuers *Witches*, and

Experiment
Solitary touch-
ing the Vene-
mous Quality
of *Mans Flesh*.

26

Sorceresses, as well amongst the *Heathen*, as amongst the *Christians*, have fedd vpon *Mans flesh*, to aid (as it seemeth) their *Imagination*, with High and foule Vapours:

Experiment
Solitary touch-
ing the *Verfi-
on* and Trans-
mutation of
Aire into
Water.

27

IT seemeth that ther be these waies (in likelihood) of *Version* of *Vapours*, or *Aire*, into *Water* and *Moisture*. The first is *Cold*; which doth manifestly *Condense*; As wee see in the *Contracting* of the *Aire* in the *weather-Glasse*; whereby it is a Degree nearer to *water*. Wee see it also in the *Generation* of *Springs*, which the *Ancients* thought (very probably) to be made by the *Version* of *Aire* into *water*, holpen by the *Rest*, which the *Aire* hath in those Parts; wherby it cannot dissipate. And by the *Coldnes* of *Rockes*; for ther *Springs* are chiefly generated. Wee see it also in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by *Snow*, *Nitre*, and *S. It.* (wherof wee shall speake hereafter,) would be transferred to the Turning of *Aire* into *water*. The Second way is by *Compression*; As in *Stillatories*, wher the *Vapour* is turned back, vpon it self, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* vpon the Couers of *Boyling Potts*; And in the *Dew* towards *Raine*, vpon *Marble*, and *wauescott*. But this is liketo doe no great effect; Except it be vpon *Vapours*, and grosse *Aire*, that are already very neare in Degree to *Water*. The Third is that, which may be searched into, but doth not yet appeare; which is, by *Mingling* of moist *Vapours* with *Aire*; And trying if they will not bring a Returne of more *Water*, then the *water* was at first: For if so; That Increase is a *version* of the *Aire*: Therfore putt *water* into the Bottom of a *Stillatory*, with the Neck stopped; Weigh the *water* first; Hang in the Middle of the *Stillatory* a large *Sponge*; And see what Quantitie of *water* you can crush out of it; And what it is more, or lesse, compared with the *water* spent; For you must vnderstand, that if any *Version* can be wrought, it will be easeliest done in small Pores: And that is the Reason why wee prescribe a *Sponge*. The Fourth way is Probable also, though not Appearing; Which is, by *Receiuing* the *Aire* into the small Pores of *Bodies*; For (as hath been said) euery thing in small Quantity is more easy for *version*; And Tangible *Bodies* haue no pleasure in the Consort of *Aire*, but endeavour to subact it into a more *Dense Body*: But in *Entire Bodies* it is checked; because if the *Aire* should *Condense*, ther is nothing to succeed: Therfore it must be in loose *Bodies*, as *sand*, and *Powder*; which wee see, if they lye close, of themselues gather *Moisture*.

Experiment
Solitary touch-
ing the *Helses*
towards the
Beauty and
good Features
of *Persons*.

28

IT is reported by some of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into such a Cage, or Boxe, as they cannot rise to their Stature, but may encrease in Breadth, or length; will growe accordingly, as they can gett Roome: which if it be true, and faisible, and that the young *Creature* so pressed, and straightened,

tened, doth not therupon die; It is a Meane to produce *Dwarfse Creatures*, and in a very Strange Figure. This is certaine, and noted long since; That the Pressure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Macracephali*; which shape of the Head, at that time, was esteemed. And the Raising gently of the Bridge of the Nose, doth prevent the Deformity of a Saddle Nose. Which obseruation well weighed, may teach a Meanes, to make the Persons of Men, and Women, in many kindes, more comely, and better featured, then otherwise they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking vp the Calues of the Leggs, to keepe them from falling downe too lowe; And by Stroaking vp the Forehead to keepe them from being lowforeheaded. And it is a common Practise to swath Infants, that they may growe more straight, and better shaped: And wee see Young Women, by wearing straight Bodies, keepe themselves from being Grosse, and Corpulent.

O Nions, as they hang, will many of them shoot forth; And so will *Pennsivall*; And to will an Herb called *Orpin*, with which they vse, in the Country, to trimme their Houses, binding it to a Lath, or Strick, and setting it against a wall. We see it likewise, more especially, in the greater *Semper-vive*, which will put out Branches, two or three yeares: But it is true, that commonly they wrapp the Root in a Cloth besmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by some of the *Ancients*, of the *Stalks of Lillies*. The Cause is; For that these *Plants* haue a Strong, Dense, and Succulent Moisture, which is not apt to exhale; And so is able, from the old store, without drawing helpe from the Earth, to suffice the sprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. We see also, that *Stumps of Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Consequence, to try whether these things, in the Sprouting, doe increase *Weight*; which must be tried, by weighing them before they be hangd vp; And afterwards againe, when they are sprouted. For if they encrease not in *Weight*; Then it is no more but this; That what they send forth in the Sprout, they leese in some other Part: But if they gather *Weight*, then it is *Magnale Nature*; For it sheweth that *Aire* may be made so to be Condensed, as to be conuerted into a *Dense Body*; wheras the Race and Period of all things, here about the Earth, is to extenuate and turne things to be more *Pneumaticall*, and Rare; And not to be Retrograde, from *Pneumaticall* to that which is *Dense*. It sheweth also, that *Aire* can *Nourish*; which is another great Matter of Consequence. Note, that to try this, the *Experiment* of the *Semper-vive* must be made without Oiling the Cloth; For els, it may be, the *Plant* receiueth Nourishment from the *Oile*.

Experiments
Solitary touch-
ing the Con-
densing of
Aire, in such
sort as it may
put on *Weight*,
and yield *Nou-
rishment*.

Experiment
Solitary tou-
ching the Co-
mixture of
Flame and
Aire, and the
great Force
therof.

30

F*lame* and *Aire* doe not Mingle, except it be in an *Instant*; Or in the *Vitall Spirits* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath been ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus far it is true: And then (forsooth) it is become another Element; the Forme wherof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, ther must needes also follow an Expulsion of the pellet; Or Blowing vp of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if ther were nothing els, except it were in very great quantity, will be suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which hauing in it a notable Crude and windy *Spirit*, first by the Heate of the *Fire* suddainly dilareth it self; (And wee knowe that simple *Aire*, being preternaturally attenuated by Heate, will make it self Roome, and brake and blowe vp that which resisteth it;) And Secondly, when the *Nitre* hath Dilated it self, it bloweth abroad the *Flame*, as an Inward Bellowes. And therefore wee see that *Brimstone*, *Pitch*, *Camphire*, *Wild-fire*, and diuers other Inflammable Masters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick Silver*, (which is a most Crude and Watry Body) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spirits* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a Body that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*,) *Water*, and *Oyle*; For they likewise will not well mingle of themselues, but in the Bodies of *Plants*, and *living Creatures*, they will. It is no maruaile therefore, that a small Quantity of *Spirits*, in the Cells of the Braine, and Canales of the Sinewes, are able to moue the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, As in playing Diuision vpon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment
Solitary tou-
ching the Se-
cret Nature
of *Flame*.

31

TAKE a small *waxe Candle*, and putt it in a Socket, of *Brasse*, or *Iron*; Then sett it vpright in a *Porringer* full of *Spirit of Wine*, heated: Then sett both the *Candle*, and *Spirit of wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become 4. or 5. times bigger then otherwise it would haue been; and appeare in Figure *Globular* and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whit blewe towards the Colour of the Outward flame of the *Spirit of wine*. This is a Noble

Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *Water* with *Water*, but only remaineth contiguous; As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a *Piramis* is *Flame*, which we vsually see, is meerely by Accident, and that the *Aire* about, by quenching the *Sides* of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would be Round: And therefore *Smoake* is in the Figure of a *Piramis* Reuerfed; For the *Aire* quencheth the *Flame*, and receiueh the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and moue vpwards, but moueth waing, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as moue vpwards. By all which, it should seeme, that the Caelestiall Bodies, (most of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Detrminate; They haue Rotation; And they haue the Colour and Splendour of *Flame*: So that *Flame* about is Durable, and Consistent, and in his Naturall place; But with vs, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Take an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outfides of the *Flame*, more burned, blacked, and turned almost into a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discouery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the *Sides*, than in the Middest: And, which is more, that *Heat* or *Fire* is not violent or furious, but where it is checked, and pent. And therefore the *Peripatetickes* (howsoeuer their opinion of an *Element* of *Fire* about the *Aire* is iustly exploded;) in that Point they acquit themselues well: For being opposed, that if there were a *Sphere* of *Fire*, that incompassed the Earth so neare hand, it were impossible but all things should be burnt vp; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment
Solitary touching the Different force of
Flame in the
Middest and on
the Sides.

32

Experiment
Solitary touching the Decrease of the
Naturall motion of Gravity in
great distance
from the Earth;
or within some
depth of the
Earth.

It is affirmed constantly by many, as an vsuall Experiment; That a *Lump* of *Fire*, in the Bottome of a Mine, will be tumbled, and stirred, by two Mens strength; which if you bring it to the Topp of the Earth, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the Motion

of *Granitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Vnion of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Mouing to a *Point* or Place (which was the Opinion of the *Ancients*) it is a meere Vanity.

Experiment
Solitary touch-
ing the Con-
traction of Bo-
dies in Bulke, by
the Mixture of
the more Li-
quid Body with
the more Solid.

34

It is strange, how the *Ancients* tooke vpon credit, and yet did build great Matters vpon them. The Obseruation of some of the best of them, deliuered confidently is, That a *Vessel* filled with *Ashes*, will receiue the like quantity of *Water*, that it would haue done, if it had been empty. But this is vtterly vntrue; for the *Water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As we see that *Ashes* alone, if they be hard pressed, will lye in lesse roome: And so the *Ashes* with Aire betweene, lye looser; and with *Water*, closer. For I haue not yet found certainly, that the *Water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment
Solitary touch-
ing the Ma-
king Vines more
fruitfull.

35

It is reported of credit, that if you lay good store of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier, and prosper better. It may be tried with other *Kernells*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernells* of *Apples*, &c. The Cause may be, for that the *Kernells* draw out of the Earth Iuice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and deuoureth the Nourishment, when they haue drawne it: As great *Fishes* deuoure little.

Experiments
in Confort
touching Pur-
ging Medicines.

36

The Operation of *Purging Medicines*, and the Causes thereof, haue beene thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The Causes of *Purging* are diuers; All plaine and perspicuous; And thoroughly maintained by Experience. The first is, That whatsoever cannot be overcome and digested by the *Stomacke*, is by the *Stomacke*, either put vp by *Vomit*, or put downe to the *Guts*; And by that Motion of *Expulsion* in the *Stomacke*, and *Guts*, other Parts of the Body, (as the *Orifices* of the *Veines*, and the like) are moued to expell by *Consent*. For nothing is more frequent than Motion of *Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquantida*, &c. Loathsome and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of secret Malignity, and disagreement towards Mans Bodie, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*,

that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to be held suspected, as a kinde of *Peyson*; For that it worketh either by *Corrosion*, or by a *secret Malignitie* and Enmitie to *Nature*: And therefore such *Medicines* are warily to be prepared, and vsed. The *Quantitie* of that which is taken, doth also cause *Purging*; As we see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie* of *Meat*; For *Surfets* many times turne to *Purges*, both vpwards, and downwards. Therefore we see generally, that the working of *Purging Medicines*, cometh two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a prooffe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth prouoke the Part to expell; And *Mustard* prouoketh Sneezing: And any Sharpe Thing to the Eyes, prouoketh Teares. And therefore we see that almost all *Purgers* haue a kinde of *Twiching* and *vellication*, besides the *Gripping* which cometh of wind. And if this *Mordication* be in an ouer-high Degree, it is little better than the *Corrosion* of *Posson*; And it cometh to passe sometimes in *Antimony*; Especially if it be giuen, to Bodies not repleat with Humors; For where Humors abound, the Humors saue the Parts.

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* haue in them a direct Force of *Attraction*; As *Drawing Plasters* haue in *Surgery*: And we see *Sage*, or *Betony* brused, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*;) put into the Nose, draw *Flegme*, and water from the Head; And so it is in *Apoplegmatisms*, and *Gargarismes*, that draw the *Rheume* downe by the *Pallate*. And by this Vertue, no doubt some *Purgers* draw more one Humour, and some another, according to the Opinion receiued: As *Rubarb* draweth *Choller*; *Scam* Melancholy; *Agarick* *Flegme*; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides *Sympathy*, between the *Purger* and the *Humour*, there is also another *Cause*, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* work quicker than others: And they that draw quick, draw only the Lighter, & more fluide Humours; they that draw slow, worke vpon the more Tough, and Viscous Humours. And therefore Men must beware, how they take *Rubarb*, and the like, alone, familiarly; For it taketh only the Lightest part of the Humour away, and leaueth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified.

The fourth *Cause* is *Plausosity*; For *Wind* stirred moueth to expell: And we finde that (in effect) all *Purgers* haue in them a raw *Spirit*, or *Wind*; which is the Principall *Cause* of *Torsion* in the *Stomach*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by *Decoction* vpon the Fire; And for that Cause are giuen chiefly in *Infusion*, *Iuyce*, or *Powder*.

40

The fifth Cause is *Compression*, or *Crushing*: As when *Water* is Crushed out of a *Sponge*: So we see that *Taking Cold* moueth Loosenesse by Contraction of the Skinn, and outward Parts; And so doth *Cold* likewise cause Rheumes, and Defluxions from the Head; And some *Astringent Plasters* crush out purulent Matter. This kind of Operation is not found in many *Medicines*: *Mirabolanes* haue it; And it may be the *Barkes of Peaches*; For this Vertue requireth an *Astriction*; but such an *Astriction*, as is not gratefull to the Body; (For a pleasing *Astriction* doth rather Binde in the Humours, than Expell them:) And therefore such *Astriction* is found in Things of an Harriish Taste.

41

The Sixth Cause is *Lubrification*, and *Relaxation*. As we see in *Medicines Emollientes*; Such as are *Milke*, *Honey*, *Mallows*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is also a secret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold* relaxeth: As it is seene in *Vrine*, *Bloud*, *Postage*, or the like; which, if they be *Cold*, breake, and dissolue. And by this kinde of *Relaxation*, *Feare* loosneth the Belly; because the *Heat* retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the same manner, as *Feare* also causeth Trembling in the Sinewes. And of this Kinde of *Purgers* are some *Medicines* made of *Mercury*.

42

The Seuenth Cause is *Absterision*; which is plainly a *Scouring off*, or *Incision* of the more viscosus Humors, and making the Humors more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which scoureth Linnen Cloth (speedily) from the Foulennesse. But this *Incision* must be by a *Sharpnesse*, without *Astriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43

There be *Medicines*, that moue *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Those that *Purge by Stooles* are such as enter not at all, or little into the *Mesentery Veines*; But either at the first are not digestible by the *Stomach*, and therefore moue immediatly downwards to the Gutts; Or else are afterwards reiected by the *Mesentery Veines*, and so turne likewise downwards to the Gutts; and of these two kinds are most *Purgers*. But those that moue *Vrine*, are such, as are well digested of the *Stomach*, and well receiued also of the *Mesentery Veines*; So they come as farre as the *Liuer*, which sendeth *Vrine* to the *Bladder*, as the *Whey* of *Bloud*: And those *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liuer*, in sending downe the wheyey Part of the *Bloud* to the *Reines*. For *Medicines Vrinatiue* doe not worke by Reiection, and Indigestion, as *Solutiue* doe.

44

There be diuers *Medicines*, which in greater *Quantity*, moue *Stooles*, and in smaller, *Vrine*: And so contrariwise, some that in greater *Quantity*, moue *Vrine*, and in Smaller, *Stooles*. Of the former sort is *Rubarb*, and some others. The Cause is, for that *Rubarb* is a *Medicine*, which the *Stomach* in a small *Quantity* doth digest, and ouercome, (being not Flatuous, nor Loathsome;) and so sendeth it to the *Mesentery Veines*; And so being opening, it helpeth downe *Vrine*: But in a greater *Quantitie*,
the

the *Stomach* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to be of the second sort; which being in small *Quantity*, moueth wind in the *Stomach* and *Gutts*, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *Wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liner*, and *Reines*; where, by Heating and Opening, it sendeth downe *Urine* more plentifully.

Wee haue spoken of *Euscuating* of the *Body*; wee will now speake something of the *Filling* of it by *Restoratines* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than another; As *Graines*, and *Roots* nourish more, than the *Leaues*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding *Leaues* vnable to Nourish Mans *Body*. Whether there be that difference in the *Flesh* of *Lining Creatures*, is not well inquired: As whether *Liners*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liner* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceiue that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very Nourishing *Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Jelly* also, which they vse for a Restorative, is chiefly made of *Knuckles of Veale*. The *Pulp* that is within the *Crashe* or *Crabb*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crabb* or *Crashe*. The *Yalkes* of *Egges* are clearely more Nourishing than the *Whites*. So that it should seeme, that the Parts of *Lining Creatures*, that lye more Inwards, nourish more than the Outward *Flesh*: Except it bee the *Braine*; which the *Spirits* prey too much vpon, to leaue it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in *Consumptions*, some such thing should be Deuised, as should be halfe *Chylus*, before it be put into the *Stomach*.

Take two large *Capons*; perboile them vpon a soft fire, by the space of an houre, or more, till in effect all the *Bloud* be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shanckes*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat *Boulter*; Then take a *Kilderkin*, sweet, and well seasoned, of foure gallons of *Beere*, of *R. B.* strength, new as it commeth from the Tunning; Make in the *Kilderkin* a great Bung-hole of purpose: Then thrust into it, the *Boulter* (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and a halfe; Then draw

Experiments
in Conioint
touching Meats
and Drinks that
are most Nour-
ishing.

45

46

draw it into bottles, and you may drinke it well after three dayes Bot-
teling; And it will last six weeks (approued.) It drinketh fresh, flow-
reth and mantleth exceedingly; It drinketh not newish at all; It is an
excellent Drinke for a Consumption, to be drunke either alone, or Car-
ded with some other Beere. It quencheth Thirst, and hath no whit of
windinesse. Note, that it is not possible, that Meat and Bread, either in
Broths, or taken with Drink, as is vsed, should get forth into the veines,
and outward Parts, so finely, and easily, as when it is thus Incorporate,
and made almost a *Chylus* aforehand.

47

Triall would bee made of the like Brew with *Potado Roots*, or *Barr
Roots*, or the *Pith* of *Artichoakes*, which are nourishing Meats: It may
be tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Pigge*,
Venison, especially of *young Deere*, &c.

48

A *Mortresse* made with the *Brawne* of *Capons*, stamped, and strained,
and mingled (after it is made) with like quantitie, (at the least,) of
Almond Butter; is an excellent Meat to Nourish those that are weake;
Better than *Blanck-Manger*, or *Jelly*: And so is the *Cullice* of *Cocks*, boyled
thick with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cul-
lice*, of it selfe, is more Sauoury and strong; And not so fit for Nouri-
shing of weake Bodies; But the *Almonds* that are not of so high a taste
as *Fleish*, doe excellently qualifie it.

49

Indian Maiz hath (of certaine) an excellent Spirit of Nourish-
ment; But it must be thoroughly boyled, and made into a *Maiz-Cream*
like a *Barley Cream*. I iudge the same of *Rize*, made into a *Cream*;
For *Rize* is in *Turky*, and other Countries of the East, most sed vpon;
But it must be thoroughly boyled in respect of the Hardnesse of it: And
also because otherwise it bindeth the Body too much.

50

Pistachoes, so they be good, and not musty, ioyned with *Almonds* in *Al-
mond Milke*; Or made into a *Milke* of themselves, like vnto *Almond
Milke*, but more Greene, are an excellent Nourisher. But you shall doe
well, to adde a little *Ginger*, scraped, because they are not without some
subtrill windinesse.

51

Milke warme from the Cow, is found to be a great Nourisher, and a
good Remedy in *Consumptions*: But then you must put into it, when
you milke the Cow, two little bagges; the one of *Powder* of *Mint*, the
other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from
Turning, or Crudling in the stomach; And put in Sugar also, for the
same cause, and partly for the Taste sake; But you must drinke a good
draught that it may stay lesse time in the stomach, lest it Cruddle: And
let the Cup into which you milke the Cow, bee set in a greater Cup
of hot water, that you may take it warme. And *Cow-milke* thus prepared,
I iudge to be better for a *Consumption*, than *Asse-milke*, which (it is true)
turneth not so easily, but it is a little harrish; Marry it is more proper
for Sharpnesse of *Vrine*, and Exulceration of the Bladder, and all man-
ner of Lenifyings. *Womans milke* likewise is prescribed, when all faile;
but I commend it not; as being a little too neere the Iuyce of Mans Bo-
dy,

dy. to be a good Nourisher; Except it be in *Infants*, to whom it is Naturall.

Oyle of Sweet Almonds, newly drawn, with *Sugar*, and a little *Spice*, spread vpon Bread tosted, is an Excellent Nourisher; But then to keepe the *Oyle* from frying in the Stomach, you must drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much, you must put in a little Powder of Cinnamon.

The *Talkes of Eggs* are of themselves so well prepared by Nature for Nourishment; As (so they be Porched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken also rawe, when they are new laid, with *Malmesey*, or *Sweet wine*; You shall doe well to put in some few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, besides the immediate Facultie of Nourishment, such Drinke will strengthen the Backe; So that it will not draw downe the *Urine* too fast; For too much *Urine* doth alwaies hinder Nourishment.

Mincing of meat, as in *Pies*, and *buttered Minced Meat*, saue the Grinding of the Teeth; And therefore, (no doubt) it is more Nourishing; Especially in Age; Or to them that haue weake Teerh; But the Butter is not so proper for weake Bodies; And therefore it were good to moisten it with a little *Clarret wine*, Pill of *Limon*, or *Orange*, cut small, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuckets*, which are likewise minced Meat, in stead of Butter, and Fat, it were good to moisten them, partly with *Creame*, or *Almond*, or *Pistachomilke*; or *Barly*, or *Malt-Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we referue to the due place.

Wee haue hitherto handled the Particulars which yeeld best, and easiest, and plentifullest Nourishment; And now we will speake of the best Meanes of Conueying, and Conuerting the Nourishment.

The First Meanes is, to procure that the Nourishment may not be robbed, and drawn away; wherein that, which we haue already said, is very Materiall; To prouide, that the *Reines* draw not too strongly an ouer-great Part of the *Bloud* into *Urine*. To this adde that Precept of *Aristotle*, that *Wine* be forborne in all *Consumptions*; For that the *Spirits* of the *Wine*, doe prey vpon the *Roside Iuyce* of the Body, and inter-common with the *Spirits* of the Body, and so deceiue and robbe them of their Nourishment. And therefore if the *Consumption* growing from the weaknes of the Stomach, doe force you to vse *Wine*, let it alwaies be burnt, that the Quicker *Spirits* may euaporate; or at the least quenched with two little wedges of *Gold*, six or seuen times repeated. Adde also this Prouision, That there be not too much *Expence* of the Nourishment, by *Exhaling*, and *Sweating*; And therefore if the Patient be apt to sweat, it must be gently restrained. But chiefly *Hippocrates* Rule is to bee followed; who aduiseeth quite contrary to that which is in vse: Namely, that the *Linnen*, or *Garmens* next the *Flesh*, be in Winter drie, and oft changed;

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changed; And in Sommer seldome changed, and smeared ouer with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to haue the *Linnen* smeared lightly ouer, with Oyle of *Sweet Almonds*; And not to forbear shifting as oft as is fit.

56 The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, because the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherin it hath beene tried, that the *Quills* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it be dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the *Stomach*: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower, that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57 The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that *Bears*, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeued) that *Sleepe* doth *Nourish* much; Both for that the *Spirits* do lesse spend the *Nourishment* in *Sleepe*, then when liuing *Creatures* are awake: And because (that which is to the present purpose) it helpeth to thrust out the *Nourishment* into the *Parts*. Therefore in Aged men, and weake Bodies, and such as abound not with *Choller*, a short *Sleepe* after dinner doth helpe to *Nourish*; For in such Bodies there is no feare of an ouer-hastie *Digestion*, which is the Inconuenience of *Postmeridian Sleepes*. *Sleepe* also in the Morning, after the taking of somewhat of easie *Digestion*; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further *Nourishment*: But this would bee done, sitting vpright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the *Stomach*.

58 The Fourth *Meanes* is to provide that the *Parts* themselues may draw to them the *Nourishment* strongly. There is an Excellent Observation of *Aristotle*; That a great Reason, why *Plants* (some of them) are of greater Age, than *Liuing Creatures*, is, for that they yearely put forth new *Leaues*, and *Boughes*; whereas *Liuing Creatures* put forth (after their Period of Growth,) nothing that is young, but *Haire* and *Nails*, which are Excrements, and no *Parts*. And it is most certaine, that whatsoever is young, doth draw *Nourishment* better, than that which is Old; And then (that which is the Mystery of that Observation) young *Boughes*, and *Leaues*, calling the Sap vp to them; the same *Nourisheth* the *Body*, in the Passage. And this we see notably proued also, in that the oft Cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferrre therefore this Observation to the
Helping

Helping of Nourishment in *Living Creatures*: The Noblest and Principall Use whereof is, for the *Prolongation of Life*; *Restoration* of some Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nourish, and Repaire easily; And Parts that Nourish and repaire hardly; And you must refresh, and renew those that are easie to Nourish; that the other may be refreshed, and (as it were) Drinke in Nourishment, in the Passage. Now wee see that *Draught Oxen*, put into good Pasture, recover the Flesh of young Beefe; And Men after long Emaciating Diets, waxe plump, and fat, and almost New: So that you may surely conclude, that the frequent and wise Use of those *Emaciating Diets*, and of *Purgings*; And perhaps of some kinde of *Bleeding*; is a principall Meanes of *Prolongation of Life*; and *Restoring* some Degree of *Youth*: For as we haue often said, *Death* commeth vpon *Living Creatures* like the Torment of *Mæstus*,

Mortua quætiâ iungebat Corpora uinis,

Componentis Munibusq; Manus, atq; Oribus Ora.

For the Parts in Mans Body easly reparable, (as *Spirits, Blood, and Flesh*;) die in the Embracement of the Parts hardly reparable, (as *Bones, Nerves, and Membranes*;) And likewise some *Entrails* (which they reckon amongst the *Spermatick Parts*) are hard to repaire: Though that Diuision of *Spermatick*, and *Menstruall Parts*, be but a Conceit. And this same *Observation* also may be drawne to the present purpose of Nourishing Emaciated Bodies: And therefore *Gentle Friction* draweth forth the Nourishment, by making the Parts a little hungry, and heating them; whereby they call forth Nourishment the better. This *Friction* I wish to be done in the Morning. It is also best done by the *Hand*, or a peece of *Scarlet wood*, wet a little with *Oile of Almonds*, mingled with a small Quantity of *Bay-salt*, or *Saffron*. We see that the very Currying of Horses doth make them fat, and in good liking.

The Fifth Meanes is, to further the very *Act* of *Assimilation* of *Nourishment*, which is done by some outward *Emollients*, that make the Parts more apt to *Assimilate*. For which I haue compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide the Receipt*. The use of it would be betwene Sleepes; For in the latter Sleepe the Parts *Assimilate* chiefly.

There be many *Medicines*, which by themselves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I haue tried (my selfe) a *Remedy* for the *Gout*, which hath seldome failed, but driuen it away in 24. Houres space: It is first to apply a *Pulvisse*; Of which *vide the Receipt*; And then a *Bath* or *Fomentation*, of which *vide the Receipt*; And then a *Plaster*, *vide the Receipt*. The *Pulvisse* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pulvisse*, Draweth gently; And therefore draweth the Humour out; and doth not draw more to it; For it

is a *Gentle Fomentation*, and hath withall a Mixture, (though very little) of some *Stupefacitive*. The *Plaster* is a Moderate *Astringent Plaster*, which repelleth New Humour from falling. The *Pulvisse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pulvisse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaster* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pulvisse* is to be laid to for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being vsed hot, and seuen or eight times repeated: The *Plaster* to continue on still, till the Part be well confirmed.

Experiment
Solitary touch-
ing Cure by
Custome.

61

There is a secret Way of Cure, (vnpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* haue beene made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are seldom infected. *Enduring of Torture*, by *Custome*, hath been made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *Wine* or *Strong Drinke*, hath beene, by *Custome*, made to be without *Surfet*, or *Drunkenesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisickes*, some kindes of *Palsies*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Disease* be Incurable; Or whether the first Cure of it be not full of perill; And if he finde it to bee such, let him resort to *Palliation*; And allenuiate the *Symptome*, without busying himselfe too much with the perfect Cure: And many times, (if the *Patient* be indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strine, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment
Solitary touch-
ing Cure by
Excess.

62

Diuers *Diseases*, especially *Chronicall*, (such as *Quartan Agues*;) are sometimes cured by *Surfet*, and *Excesses*; As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fastings*, *Extraordinary Stirring*, or *Lazitude*, &c. the like. The Cause is, for that *Diseases* of *Cōtinuance* get an Adētitious Strength frō *Custome*, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them only to their first Cause; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur Nature, which thereupon riseth more forcibly against the *Disease*.

Experiment
Solitary touch-
ing Cure by
Motion of Con-
sent.

63

There is in the Body of Man a great *Consent* in the *Motion* of the seuerall Parts. We see, it is Childrens sport, to proue whether they can rub vpon their Brest with one hand, and pat vpon their Fore-head with another; And straight-waies, they shall sometimes rubbe with both Hands, or pat with both hands. We see, that when the Spirits, that come to the Nosthrills, expell a bad Sent, the Stomach is ready to Expell

pell by Vomir. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot be expelled by *Sweat*, they fall likewise into *Loosenesse*, and that is commonly Mortall. Therefore *Physitians* should ingeniously contriue, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Hippocrates Aphorisme, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the *Accident of Sicknesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should be more forcible: And so (no doubt) it is; if you suppose like *Quantity* of *Matter*. But that, which maketh good the *Aphorisme*, is; Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to ouercome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physitian* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Physitians do wisely prescribe, that there be *Preparatives* vsed before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body be not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the *Humours*, and their not comming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purge not sufficiently. Therefore the worke of *Preparation* is double; To make the *Humours* *fluide*, and mature; And to make the *Passages* more open: For both these helpe to make the *Humours* passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Breaths*, *Clisters* also helpe. lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies* abounding with *Humours*; And fat *Bodies*; And *Open weather*; are *Preparatives* in themselves; because they make the *Humours* more fluide. But let a *Physitian* beware, how he purge after hard *Froste Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the Lodging of some *Humours* in ill Places: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially *Passages*.) doe much mischief. Therefore it is good, after *Purging*, to vs: *Apozumes*, and *Broths*, not so much *Opening* as those vsed before *Purging*, but *Abstersiue* and

Experiment
Solitary touching cure of
Diseases which
are contrary to
Predisposition.

64

Experiment
Solitary touching
Preparations before
Purging, and
settling of the
Body afterward.

65

Stanchifying Clifters also are good to conclude with, to draw away the Reliques of the Humours, that may have descended to the *Lower Region of the Body*.

Experiment
Solitary touch-
ing *Stanching*
of *Bloud*.

66

Bloud is stanch'd diuers waies. First by *Astringents*, and *Repercussive Medicines*. Secondly by *Drawing of the Spirits and Bloud inwards*; which is done by *Cold*; As *Iron*, or a *Stone* laid to the neck doth stanch the Bleeding at the Nose; Also it hath beene tryed, that the *Testicles*, being put into sharp Vineger, hath made a suddaine Recess of the Spirits, and stanch'd *Bloud*. Thirdly by the *Recess of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thrust into the Body of a Capon, or Sheepe, new ript and bleeding, hath stanch'd *Bloud*; The *Bloud*, as it seemeth, sucking and drawing vp, by similitude of substance, the *Bloud* it meeteth with, and so it selfe going backe. Fourthly by *Custom and Time*; So the Prince of *Aurange*, in his first hurt, by the *Spanish Boy*, could finde no meanes to stanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to haue the *Orifice of the Wound* stopped by *Mens Thumbs*, succeeding one another, for the space at least of two Dayes; And at the last she *bloud* by *Custom* onely retired. There is a fifth Way also in use, to let *Bloud* in an *Adverse Part*, for a *Reuulsion*.

Experiment Solitary touching
Change of Aliments and *Medicines*.

67

It helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the same *Medicine* & *Aliment* still. The Cause is, for that *Nature* by continuall Use of any Thing, groweth to a *Sacietie*, and *Dulnesse*, either of *Appetite*, or *Working*. And we see that *Assuetude of Things Hurtfull* doth make them lesse their force to Hurt; As *Poyson*, which with use some haue brought themselves to brooke. And therefore it is no maruaile, though *Things helpfull*, by *Custom*, lesse their force to Helpe. I count *Intermission* almost the same thing with *Change*; For that, that hath beene intermitted, is after a sort new.

Experiment Solitary touching
Diets.

68

It is found by Experience, that in *Diets of Guaiacum, Sarza*, and the like (especially if they be strict,) the *Patient* is more troubled in the beginning, then after continuance; Which hath made some of the more delicate Sort of patients, giue them ouer in the midst; Supposing that if those *Diets* trouble them so much at first, they shall not be able to endure them to the End. But the Cause is, for that all those *Diets*, doe drie vp *Humours, Rheumes*, and the like; And they cannot Drie vp vntill they haue first attenuated; And while the *Humour* is attenuated, it is more Fluid, then it was before, and troubleth the Body a great deale more, vntill it be dried vp, and consumed. And therefore *Patients* must expect a due time, and not checke at them at the first.

Experiments
in Consort
touching the
Production of Cold.

The *Producing of Cold* is a thing very worthy the Inquisition; both for Use, and Disclosure of Causes. For *Heat* and

Cold

Cold are *Natures* two Hands, whereby she chiefly worketh : And *Heat* we haue in readinesse, in respect of the *Fire*, But for *Cold* we must staie till it commeth ; or seecke it in deepe Caues, or high Mountaines: And when all is done, we cannot obtaine it in any great degree : For *Furnaces* of *Fire* are farre hotter, then a *Sommers Sunne* ; But *Valleys*, or *Hills* are not much Colder then a *Winters Frost*.

The first *Meanes* of *Producing Cold*, is that which *Nature* presenteth vs withall ; Namely the *Expiring* of *Cold* out of the *Inward Parts* of the *Earth* in *Winter*, when the *Sun* hath no power to ouercome it ; the *Earth* being (as hath beene noted by some) *Primum Frigidum*. This hath beene asserted, as well by Auncient as by Moderne *Philosophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Authour* of the discourse in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Telesius*, who hath renewed the *Philosophy* of *Parmenides*, and is the best of the *Nonellists*.

The Second *Cause* of *Cold* is the *Contact* of *Cold Bodies* ; For *Cold* is *Active* and *Transitive* into *Bodies* *Adiacent*, as well as *Heat* : which is seene in those things that are touched with *Snow* or *Cold water*. And therefore, whosoeuer will be an *Inquirer* into *Nature*, let him resort to a *Conservatory* of *Snow* and *Ice* ; Such as they use for delicacy, to coole *Wine* in *Summer* : Which is a Poore and Contemprible vse, in respect of other uses, that may bee made of such *Conservatories*.

The Third *Cause* is the *Primary Nature* of all *Tangible bodies*: For it is well to be noted, that all Things whatsoeuer (*Tangible*) are of themselves *Cold* ; Except they haue an *Accessory Heat* by *fire*, *Life* ; or *Motion* : For euen the *Spirit* of *Wine*, or *Chymicall Oyles*, which are so hot in Operation, are to the first Touch *Cold*; And *Aire* it selfe compressed, and Condensed a little by blowing, is *Cold*.

The Fourth *Cause* is the *Density* of the *Body* ; For all *Dense Bodies* are *Colder* then most other *Bodies*; As *Metalls*, *Stone*, *Glasse*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Dense*, *Tangible*, hold all of the *Nature* of *Cold*. The *Cause* is, for that all *Matters Tangible* being *Cold*, it must needs follow, that where the *Matter* is most Congregate, the *Cold* is the greater.

The Fifth *Cause* of *Cold*, or rather of increase and vehemence of *Cold*, is a *Quicke Spirit* inclosed in a *Cold Body* : As will appeare to any that shall attentiously consider of *Nature* in many Instances. Wee see *Nitre* (which hath a *Quicke Spirit*) is *Cold* ; more *Cold* to the Tongue, then a *Stone*; So *Water* is *Colder* then *Oile*, because it hath a *Quicker Spirit*; For all *Oile*, though it hath the *Tangible Parts* better digested then *Water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* then *Water*, because it hath more *Spirit* within it : So we see that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaseth the *Activity* of *Cold*: So some *Insecta* which haue

Spirits

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Spirit of Life, as *Snakes*, and *Silkwormes*, are, to the touch, *Cold*. So *Quick-silver* is the *Coldest* of *Mettals*, because it is *fullest of Spirit*.

74

The *Sixth Cause of Cold* is the *Chasing and Driving away of Spirits*, such as haue some *Degree of Heat*: For the *Banishing of the Heat* must needs leaue any *Body Cold*. This we see in the *Operation of Opium*, and *Stupefactiues*, vpon the *Spirits of liuing Creatures*: And it were not amisse to trie *Opium*, by laying it vpon the *Top of a Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a *Body as Glasse*, I conceiue that *Opium*, and the like, make the *Spirits fly rather by Malignity*, then by *Cold*.

75

Seuenthly, the same *Effect* must follow vpon the *Exhaling or Drawing out of the warme Spirits*, that doth vpon the *Flight of the Spirits*. There is an *Opinion*, that the *Moone* is *Magneticall of Heat*, as the *Sun* is of *Cold*, and *Moisture*: It were not amisse therefore to trie it, with *Warme waters*; The one exposed to the *Beames of the Moone*; the other with some *Skreen* betwixt the *Beames of the Moone* and the *water*; As we vse to the *Sunne* for *Shade*; And to see whether the former will coole sooner. And it were also good to inquire, what other *Meanes* there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may be a *Secret of great Power* to *Produce Cold weather*.

Experiments
in Consort touching the
Fusion and Transmutation
of Aire into water.

We haue formerly set downe the *Meanes of turning Aire into water*, in the *Experiment 27*. But because it is *Magnale Nature*; And tendeth to the subduing of a very great effect; And is also of *Manifold vse*; we will adde some *Instances in Consort* that giue light thereunto.

76

It is reported by some of the *Ancients*, that *Sailers* haue vsed, euery *Night*, to hang *Fleeces of wooll* on the *sides of their Ships*, the *Wooll* towards the *water*; And that they haue crushed fresh *Water* out of them, in the *Morning*, for their vse. And thus much we haue tried, that a *Quantitie of Wooll* tied loose together, being let downe into a deepe *Well*; And hanging in the *Middle*, some three *Fathome* from the *water*, for a *night*, in the *Winter time*; increased in weight, (as I now remember) to a *fifth Part*.

77

It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Worke-men*, in time of *Warres*, fled into *Cauces*; And the *Mouth of the Cauces* being stopped by the *Enemies*, they were famished. But long time after the dead *Bones* were found; And some *Vessels* which they had carried with them; And the vessels full of *Water*; And that *Water*, thicker, and more towards *Ice*, than *Common Water*: which is a *Notable Instance of Cendensation*, and *Induration*, by *Bariall vnder Earth*, (in *Cauces*), for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were *Emptic*. Trie therefore a *small Bladder* hung in *Snow*; And the like in *Aitre*; And the like

like in *Quick-silver*: And if you finde the *Bladders* fallen, or shrunk; you may be sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would be in a *Cave* vnder *Earth*.

It is reported of very good credit, that in the *East Indies*, if you set a Tub of *water* open, in a Room where *Clauens* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Clauens*. In the Countrey, they vse many times, in deceit, when their *wooll* is new shorne, to set some Pailles of *water* by, in the same Room; to increase the weight of the *wooll*: But it may be, that the Heat of the *wooll*, remaining from the body of the *Sheepe*; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*.

It is Reported also credibly, that *wooll* new shorne, being laid casually vpon a *Pessell* of *Vermee*, after some time, had drunke vp a great part of the *Vermee*, though the Vessell were whole without any *Flam*, and had not the Bung-hole open. In this *Instance*, there is (vpon the by) to be noted, the *Percolation*, or *Sung* of the *Vermee* through the wood; For *Vermee* of it selfe would neuer haue passed thorow the wood: So as, it seemeth, it must be first in a kinde of Vapour, before it passe.

It is especially to be noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* haue an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they haue drawne it, they will condense it more, and in effect incorporate it; For wee see that a *sponge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being put but in part, in *Water*, or *Wine*, will draw the *Liquour* higher, and beyond the place, where the *water* or *wine* commeth. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in moist Seasons: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth* of *Boxes*, and *Opening* of *Wainscot doores*; which is a kinde of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As we see in the *Filling* of the *Chops* of *Boules*, by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*; we will reserue it to the proper Title of *Attraction*.

There is also a *Version* of *Aire* into *water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *Wainscot* before and in moist weather: This must be, either by some *Moisture* the Body yeeldeth; Or else by the Moist *Aire* thickned against the hard body. But it is plaine, that it is the latter; For that we see *Wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *Wood* alone: which is caused by the *Smoothness* and *Closeness*; which letteth in no part of the Vapour, and so letteth it backe, and thickeneth it into Dew. We see also, that *Breathing* vpon a *Glasse*, or *Smooth body*, giueth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew vpon the

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the Inside of Glasse-windowes; And the *Frost* it selfe vpon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

82

It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer vnto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whercof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it be a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that *Artificiall Conuersion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments
in Consort,
touching *Indu-
ration* of Bodies.

Induration, or *Lapidification*, of Substances more Soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Accelerating thereof is very worthy to be inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper, but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And vpon that, the more grosse of the Tangible Parts doe contract and ferre themselues together; Both to Auoid *Vacuum* (as they call it;) And also to Munire themselues against the Force of the *Fire*, which they haue suffered. And the Third is by *Assimilation*; when a Hard Body Assimilath a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Mineralls*, which come (no doubt) at first, of Iuyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, and *Crystall*, which harden

len with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, and *Spiders*, which are found in it; And many more: But wee will speake of them distinctly.

For *Indurations* by *Cold*, there bee few *Trialls* of it; For wee haue no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the *Sunne*, and the *Heauens*. The likeliest *Triall* is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* actuated by *Nitre*, or *Salt*, will turne *Water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conseruing Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Nitre*,) a *Pece* of *Wood*, or a *Pece* of *Tough Clay*, and let it lye a *Moneth*, or more. 83

Another *Triall* is by *Metalline waters*, which haue virtuall *Cold* in them. Put therefore *Wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I vnderstand it, of *Metalline waters*, that come by *Washing*, or *Quenching*; And not of *Strong Waters* that come by dissolution; for they are too *Corrosiue* to consolidate. 84

It is already found, that there are some *Naturall Spring-waters*, that will *Inlapidate Wood*; Soas you shall see one *peece* of *Wood*, whereof the *Part* about the *Water* shall continue *Wood*; And the *Part* vnder the *Water* shall be turned into a kinde of *Grauelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular *Inquiry* made of them. It is certaine, that an *EGge* was found, hauing li- en many yeeres in the bottome of a *Moate*, where the *Earth* had somewhat ouergrown it; And this *EGge* was comen to the *Hardnesse* of a *Stone*; And had the *Colours* of the white and yolke perfect: And the *Shell* shining in small graines like *Sugar*, or *Alabaster*. 85

Another *Experience* there is of *Induration* by *Cold*, which is already found; which is, that *Metalls*, themselues are hardned by often *Heating* and *Quenching* in *Cold Water*: For *Cold* euer worketh most potently vpon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the *Exhal- ling* of the *Moister Parts*, doth either harden the *Body*; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the grosser part it selfe, *Runne* and *Melt*; As in the making of ordinary *Glasse*; And in the *Vitri- fication* of *Earth*, (As wee see in the *Inner Parts* of *Furnaces*;) And in the *Vitrication* of *Brick*; And of *Metalls*. And in the former of these, which is the *Hardening* by *baking*, without *Melting*, the *Heat* hath these degrees; First it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incine- rate* and *Calcinat*e. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse *Fragility*; A middle way would be taken; Which is that which *Aristotle* hath well noted; But would be thoroughly verified. It is, to decoct *Bodies* in 88
water,

water, for two or three dayes ; But they must bee such Bodies, into which the *Water* will not enter ; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* wil enter, then long Seething, will rather Soften than indurate them. As hath beene tried in *Eggs* &c. Therefore, Softer Bodies must be put into Bottles ; And the Bottles hung into *Water* seething, with the mouths open, above the *Water* ; that no *Water* may get in ; For by this Meanes, the virtuall *Heat* of the *Water* will enter ; And such a *Heat*, as will not make the Body adust, or fragile ; But the Substance of the *Water* will be shut out. This Experiment wee made ; And it sorted thus. It was tried with a Peece of *Free-stone*, and with *Penster*, put into the *Water* at large. The *Free-stone* we found receiued in some *water* ; For it was softer, and easier to scrape, then a peece of the same *Stone* kept drie . But the *Penster* into which no *water* could enter, became more white, and liker to *Siluer*, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, and a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone* ; The *Cheese* likewise very hard, and not well to be cut : The *Chalke* and the *Free-stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trialls were made by a Boyling vpon a good hot Fire, renewing the *water* as it consumed, with other hot *water* ; But the Boyling was but for twelue houres onely ; And it is like that the Experiment would haue beene more effectuall, if the Boyling had beene for two or three daies, as we prescribed before.

89

As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying neare to the top of the Earth, where *Pebble* is ; In which you may manifestly see diuers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves : And it were good to make a Triall of purpose, by taking *Clay*, and putting in it diuers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder then other *Clay* of the same lump, in which no *Pebbles* are set. Wee see also in Ruines of old Walls, especially towards the bottome, the *Mortar* will become as hard as the *Brick* ; wee see also, that the *Wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder then the *wood* it selfe ; And Scales likewise grow to the *Teeth*, harder then the *Teeth* themselves.

90

Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures* : For no Nourishment that the *Tree* receiueeth, or that the *living Creature* receiueeth, is so hard as *Wood*, *Bone*, or *Horne*, &c. but is *Indurated* after by *Assimilation*.

Experiment
Solitary touch-
ing the Per-
sion of water into
dive.

91

The Eye of the vnderstanding, is like the Eye of the Sense : For as you may see great Obiects through small Crannies, or Leuells ; So you may

may see great *Axiomes* of Nature, through small and Contemptible *Instances*. The Speedy Depredation of *Aire* vpon many *Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh vp suddenly. But the like *Cloud*, if it were *Oyle*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth vpon *Water*; And *Flame*, and *Fire*, vpon *Oyle*; And therefore, to take out a Spot of Grease, they vse a *Coale* vpon browne Paper; because *Fire* worketh vpon Grease, or *Oyle*, as *Aire* doth vpon *Water*. And we see *Paper* oyled, or *Wood* oyled, or the like, last long moist; but *Wes* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddeth little with the *Moisture* of *Oyle*.

There is an Admirable demonstration, in the same trifling *Instance* of the little *Cloud* vpon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force* of *Vnion*, euen in the least Quantities, and weakest Bodies, how much it Conducerth to Preseruatiō of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it euer breake vp, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Iuyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation vpon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Actiue Body, that should subdue it.

We haue spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Finenesse of the Strainer; we will now endeavour to reduce the same *Axiome* to a *Work*. For this Writing of our *Sylua Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description only of Nature, but a Breaking of Nature, into great and strange Workes. Triae therefore, the Anointing ouer of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and stick very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is receiued, that the Pulling off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, & where Moisture is scant. So Blew *Violets*, & other *Flowers*, if they be starued, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scartres, turne *white*: And the Hoare Haires of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

Experiment
Solitary touching the Force
of *Vnion*.

92

Experiment
Solitary touching the Producing of *Feathers* and Haires of diuers Colours.

93

come first, will be many times of diuers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *White*. This is a good *Experiment*, not only for the Producing of *Birds*, and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment
Solitary touch-
ing the Nourish-
ment of Li-
ving Creatures
before they be
brought forth.

94

It is a worke of Prouidence, that hath beene truly obserued by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females *Wombe*; haue in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and leuered from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But *Beasts*, and Men need not the matter of Nourishment within themselves; Because they are shaped within the *Wombe* of the Female, and are Nourished continually from her Body.

Experiments
in Colours touch-
ing Sympa-
thy and Anti-
pathy for Medi-
cinall vse.

95

It is an Inueterate and receiued Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Receiued, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to moue *Grauell*, and to dissolue the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe *Grauell*, as Men haue beene glad to remoue it; It was so violent.

96

It is receiued and confirmed by daily Experience, that the *Soles* of the *Feet* haue great Affinity with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that vse it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mystically, prescribe, for the Cure of the *Rheume*, that a Man should walke Continually vpon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Socks. Likewise *Pigeons bleeding*, applyed to the *Soles* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed vnto them, prouoke *Sleep*.

97

It seemeth, that as the *Feet* haue a Sympathy with the *Head*; So the *Wrists* and *Hands*, haue a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Iuyces of *Stock-Gilly-Flowers*, *Rose-Campion*, *Garlicke*, and other things; applyed to the *Wrists*, and renewed; haue cured long *Agues*. And I conceiue, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the *Hands*, *Egges of Alabaster*, and *Balls of CrySTALL*.

Of these things we shall speake more, when we handle the Title of Sympathy and Antipathy, in the proper Place.

The

Experiment
Solitary
touching the
Secret Processes of
Nature.

98

The Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Inuisible, either in respect of the *Finesse of the Body* it selfe; Or the *Smallnesse of the Parts*; Or of the *Subtily of the Motion*; is little inquired. And yet these be the Things that Gouverne Nature principally; And without which, you cannot make any true *Analysis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumatics*, that are in all *Tangible Bodies*, are scarce knowne. Sometimes they take them for *Vacuum*; whereas they are the most Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will haue them to be *Naturall Heat*, or a *Portion of the Element of Fire*; Whereas some of them are crude, and cold. And sometimes they will haue them to be the *Virtues* and *Qualities* of the *Tangible Parts*, which they see; whereas they are Things by themselves. And then, when they come to Plants and living Creatures, they call them *Soules*. And such Superficiall Speculations they haue; Like Prospects, that shew things inward, when they are but Paintings. Neither is this a Question of Words, but infinitely materiall in Nature. For *Spirits* are nothing else but a *Naturall Body*, rarified to a Proportion, & included in the *Tangible Parts* of Bodies, as in an Integument. And they be no lesse differing one from the other, than the *Dense* or *Tangible Parts*: And they are in all *Tangible Bodies* whatsoever, more or lesse: And they are neuer (almost) at rest: And from them, and their *Motions*, principally proceed *Dresfaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Visification*, and most of the Effects of Nature: For, as we haue figured them in our *Sapientia Veterum*, in the Fable of *Proserpina*, you shall in the Infernall Regiment heare little Doings of *Pluto*, but most of *Proserpina*: For *Tangible Parts* in Bodies are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in Bodies, the industry of the *Chymists* hath giuen some light, in discerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *grosse Parts* of Bodies, and the like. And the *Physicians* are content to acknowledge, that *Herbs*, and *Drugs* haue diuers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one mouing Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Astringent Parts, &c. But this whole *Inquisition* is weakly and Negligently handled. And for the more subtill differences of the *Minute Parts*, and the Posture of them in the Body, (which also hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts* of Bodies, which doe so great Effects, they haue not beene obserued at all; because they are Inuisible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* said well, when they charged him to hold, that the World was made of such little Moats, as were seene in the Sunne; *Atomus* (saith he) *necessitate Rationis & Experientia esse conuincitur; Atomum enim nemo unquam vidit.* And therefore the Tumult in the Parts of Solide Bodies, when they are compressed, which is the Cause of all

Flight

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and shall be thoroughly handled in due place,) is not scene at all. But neuerthelesse, if you know it not, or enquire it not attentively and diligently, you shall neuer be able to discern, and much lesse to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Enclosures of Bodies, whereby the effects (which were mentioned before) passe betweene the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put off by the Names of *Vertues*, and *Natures*, and *Actions*, and *Passions*, and such other *Logicall Words*.

Experiment
Solitary touching the
Power of Heat.

99

It is certaine, that of all *Powers in Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewise, that the Effects of *Heat*, are most aduanced, when it worketh vpon a Body, without losse or dissipation of the Matter; for that euer betrayeth the Account. And therefore it is true, that the power of *Heat* is best perceiued in *Distillations*, which are performed in close Vessels. and Receptacles. But yet there is a higher Degree; For howsoeuer *Distillations* doe keepe the Body in Cells, and Cloisters, without Going abroad; yet they giue space vnto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatriate, although it hath not full Liberty: wherby the true and Vltimate Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no such Reciprocation of *Rarification*, and of *Condensation*, and of *Separation*, admitted; then it is like that this *Process* of *Metastasis*, being held by the Sleeues, will turne and change into many *Metamorphoses*. Take therefore a *Square Vessell* of *Iron*, in forme of a Cube, and let it haue good thicke and strong Sides. Put into it a Cube of *Wood*, that may fill it as close as may be; And let it haue a Couer of *Iron*, as strong (at least) as the Sides; And let it be well Luted, after the manner of the *Chymists*. Then place the *Vessell* within burning *Coales*, kept quicke kindled, for some few houres space. Then take the *Vessell* from the *Fire*, and take off the Couer, and see what is become of the *Wood*. I conceiue that since all *Inflammation*, and *Evaporation* are vtterly prohibited, and the *Body* still turned vpon it Selfe, that one of these two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalgama*, (as the *Chymists* call it;) Or that the Finer Part will be turned into *Aire*, and the Groffer sticke as it were baked, and incrustate vpon the Sides of the *Vessell*; being become of a Denfer Matter, than the *Wood* it selfe, Crude. And for another Triall, take also *Water*, and put it in the like *Vessell*, stopped as before; But vse a gentler *Heat*, and remoue the vessell sometimes from the *Fire*; And againe, after some small time, when it is Cold, renew the *Heating* of it: And repeat this *Alteration* some few times: And if you can once bring to passe, that the *Water*, which is one of the Simplest of Bodies, be changed in Colour, Odour, or Taste,

after

after the manner of Compound Bodies, you may be sure that there is a great Work wrought in Nature, and a Notable Entrance made into strange Changes of Bodies, and productions: And also a Way made, to doe that by Fire, in small time, which the Sunne and Age do in long time. But of the Admirable Effects of this *Distillation in Close*, (for so we will call it) which is like the *Umbles* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; We will speake fully, in the due place; Not that we Aime at the making of *Paradisus Pimey's*; Or any such Prodigious Follies; But that we know the Effects of *Heat* will be such, as will scarce fall vnder the Conceit of Man; If the force of it be altogether kept in.

There is nothing more Certaine in Nature, than that it is impossible for any *Body*, to be vtterly *Annihilated*; But that, as it was the worke of the Omnipotency of God, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well said, by an Obscure Writer of the *Seet* of the *Chymists*; That there is no such way to effect the Strange *Transmutations* of *Bodies*, as to endeavour and vrge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained also a great Secret of Preteruacion of *Bodies* from Change; For if you can prohibit, that they neither turne into *Aire*, because no *Aire* commeth to them; Nor goe into the *Bodies Adiacent*, because they are vtterly Heterogeneall; Nor make a *Round* and *Circulation* within themselves; they will neuer change, though they be in their Nature neuer so Perishable, or Mutable. We see, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceiue the like will be of *Bodies* put into *Quick-silver*. But then they must be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they haue a greater Crassitude, they will alter in their owne Body, though they spend not. But of this,

We shall speake more, when we handle the *Title of Conservation of Bodies*.

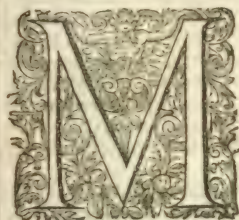
Experiment
Solitary, touching the
possibility of An-
nihilation.

100



NATVRALL HISTORIE.

II. Century.



MV S I C K E in the *Practise*, hath bin well pursued; And in good Variety; But in the *Theory*, and especially in the *Reelding* of the *Causes* of the *Practique*, very weakly; Being reduced into certaine Mysti- call Subtilties, of no vse, and not much Truth. We shall therefore, alter our manner, ioyne the *Contemplatiue* and *Actiue Part* together.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*; Wher- unto there may be an *Harmony*; which *Sounds* are euer *Equall*; As *Sing- ing*, the *Sounds* of *Stringed*, and *Wind-Instruments*, the *Ring*ing of *Bells*, &c. Or *Inmusical Sounds*; which are euer *Vaequall*; Such as are the *Voice* in *Speaking*, all *Whisperings*, all *Voices* of *Beasts*, and *Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins* (as in *Drummes*;) and infinite others.

The *Sounds* that produce *Tones*, are euer from such *Bodies*, as are in their *Parts* and *Pores* *Equall*; As well as the *Sounds* themselues are *E- quall*; And such are the *Percussions* of *Metall*, as in *Bells*; Of *Glassee*, as in the *Fillipping* of a *Drinking Glassee*; Of *Aire*, as in *Mens voices* whilest they *Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*; as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydranlickes*;

F

which

Experiments
in Confore
touching Mu-
sicke.

101

102

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bowe* or *Plestrum*, and the *String*; But between the *String* and the *Aire*; No more then it is between the *Finger* or *Quill*, and the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussions* of *Water*.

103

The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Insomuch, as it is in effect an *Unison*; As we see in *Lutes*, that are strung in the *Base Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eighth Note* in *Ascent*, (as from *Eight* to *Fifteene*: from *Fifteene* to twenty two, and so in infinitum,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therefore would be better contemplated. It seemeth that *Aire*, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all unequal, as hath beene said) admitteth much *Varietie*; As wee see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discern severall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the *Sounds* which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such *varietie*; But is forced to recurre into one and the same *Posture* or *Figure*, onely differing in *Greatnesse* and *Smalnesse*. So we see *Figures* may be made of *lines*, *Crooked* and *Straight*, in infinite *Varietie*, where there is *Inequality*; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of *Equall lines*) can differ but in *Greater*, or *Lesser*.

104

It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number of Eight*, to create the *Diapason*), that this *Computation of Eight*, is a thing rather received, than any true *Computation*. For a true *Computation* ought ever to bee, by *Distribution* into *equall Portions*. Now there be interuenient in the *Rise of Eight* (in *Tones*) two *Beemolls*, or *Halfe-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and *equall Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the *Stops of a Lute*), it maketh the *Number of thirteene*.

105

Yet this is true; That in the ordinary *Rises* and *Falles* of the *Voice* of *Man*, (not measuring the *Tone* by whole *Notes*, and halfe *Notes*, which is the *Equall Measure*;) there fall out to be two *Beemolls* (as hath beene said) betweene the *Unison* and the *Diapason*: And this *Varying* is naturall. For if a Man would endeavour to raise or fall his *Voice*, still by *Halfe-Notes*, like the *Stops of a Lute*; or by whole *Notes* alone, without *Halves*; as farre as an *Eight*; he will not be able to frame his *Voice* vnto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all *Harmonicall* vse, one *halfe Note* to be interposed.

106

It is to be considered, that whatsoever *Vertue* is in *Numbers*, for *Conducing*,

Conducing to Consent of Notes, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelve*; So that the *Seuenth*, or the *Thirteenth*, is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seuenth* and the *Thirteenth* are but the limits and Boundaries of the *recurre*.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene the *Faisow*, and the *Diapason* are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so doe my selfe and some Other yet, the *Fourth* which they call *Diatesaron*, As for the *Tenth*, *Twelfth*, *Thirteenth*, and so in *infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectively from them.

For *Discords*, the *Secund*, and the *Seuenth*, are of all others the most odious, in *Harmony*, to the *Sense*; whereof the One is next about the *Faisow*, the Other next vnder the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*.

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there be a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therefore the ordinary *Consent* of *Four* Parts consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more Aire, doth overcome and drowne the *Treble*, (vnlesse the *Discord* be very Odious;) And so hideth a small Imperfection. For we see, that in one of the *lower Strings* of a *Lute*, there foundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*.

We haue no *Musike* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For we see the *Halfe-Notes* themselves doe but interpose sometimes. Neuerthelesse we haue some *Slides*, or *Relishes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull.

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receiue light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There be two Things *Pleasing* to the *Sight*, (leauing *Pictures*, and *Shapes* aside, which are but *Secondary Obiects*; And please or displease but in *Memory*;) these two are, *Colours*, and *Order*. The *Pleasing* of *Colour* Symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the *Pleasing* of *Order* doth Symbolize with *Harmony*. And therefore we see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylinders*, &c.) how they please; whereas *unequall Figures* are but *Deformities*. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*; *Good Proportion*, or *Correspondence*: So that (out of *Question*;) *Equality*, and *Correspondence*, are the Causes of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; wherof notwithstanding we shall speake somewhat, (when we handle *Tones*;) in the generall Enquiry of *Sounds*.

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109

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111

112

Tones are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are Equall, and slide not, doe more strike and erect the *Sense*, than the other. And Ouermuch Attention hindreth *Sleepe*.

113

There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures of Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quaering*, which please so much in *Musick*, haue an Agreement with the *Glittering of Light*; As the *Moone-Beames* playing vpon a *Waue*. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great *Sweetnesse* in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close* or *Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Præter Expectatum*; For there is a *Pleasure* euen in *Being deceived*. The *Reports*, and *Fuges*, haue an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of Times*, haue an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

114

It hath been anciently held, and obserued, that the *Sense of Hearing*, and the *Kinds of Musick*, haue most Operation vpon *Manners*; As to *Incourage Men*, and make them warlike; To make them *Soft* and *Effeminate*; To make them *Graue*; To make them *Light*; To make them *Gentle* and inclined to *Pitty*, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediatly, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, haue their *Organs*, not of so present and immediate *Access* to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly vpon the *Spirits*, and is forcible while the *Object* remaineth,) it is with a *Communication* of the *Breath*, or *Vapour* of the *Object* *Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest *Motion*; doth by *Custom* of often *Affecting* the *Spirits*, and *Putting* them into one kinde of *Posture*, alter not a little the *Nature* of the *Spirits*, euen when the *Object* is removed. And therefore we see, that *Tunes* and *Aires*, euen in their owne *Nature*, haue in themselves some *Affinity* with the *Affections*; As there be *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes* inclining *Mens mindes* to *Pitty*; *Warlike Tunes*; &c. So as it is no *Maruell*, if they alter the *Spirits*; considering that *Tunes* haue a *Predisposition* to the *Motion* of the *Spirits* in themselves. But yet it hath been noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of *Passions*, conforme vnto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. We see also that seuerall *Aires*, and *Tunes*, doe please seuerall *Nations*, and *Persons*, according to the *Sympathy* they haue with their *Spirits*.

Perspectiue hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as far as concerneth *Musick*. But the *Nature of Sounds* in generall, hath been superficially obserued. It is one of the subtillest Peeces of Nature. And besides, I practise, as I doe aduise; which is, after long Inquiry of Things, Immerse in Matter, to interpose some Subject, which is Immateriate, or lesse Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is first to be considered, what *Great Motions* there are in Nature, which passe without *Sound*, or *Noise*. The *Heavens* turne about, in a most rapide Motion, without *Noise* to vs perceiued; Though in some *Dreams* they haue been said to make an excellent *Musick*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noise*. And if it be thought, that it is the Greatnesse of distance from vs, whereby the *Sound* cannot be heard; We see that *Lightnings*, and *Coruscations*, which are neere at hand, yeeld no *Sound* neither. And yet in all these, there is a Percussion and Diuision of the *Aire*. The *Windes* in the *Upper Region* (which moue the *Clouds* aboue (which we call the *Racke*) and are not perceiued below) passe without *Noise*. The *lower Windes* in a *Plaine*, except they be strong, make no *Noise*; But amongst *Trees*, the *Noise* of such *Windes* will be perceiued. And the *Windes* (generally) when they make a *Noise*, doe euer make it vnequally, Rising and Falling, and sometimes (when they are vehement,) Trembling at the Height of their Blast. *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noise*, in passing through the *Aire*, till it fall vpon the Ground, Water, Houses, or the like. *Water* in a *Riuer* (though a swift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very Streame vpon *Shallowes*, of Grauell, or Pebble, will be heard. And *Waters*, when they beat vpon the Shore, or are straitned, (as in the falls of Bridges;) Or are dashed against themselves, by *Windes*, giue a Roaring *Noise*. Any peece of *Timber*, or *Hard Body*, being thrust forwards by another Body Contiguous, without knocking, giueth no *Noise*. And so *Bodies* in weighing, one vpon another, though the *upper Body* presse the *lower Body* downe, make no *Noise*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cause of *Violent Motion*, though vnobserued;) passeth without *Sound*; For that *Sound*, that is heard sometimes, is produced onely by the Breaking of the *Aire*; And not by the Impulsion of the Parts. So it is manifest; That where the Anteriour Body giueth way, as fast as the Posterious commeth on, it maketh no *Noise*; be the *Motion* neuer so great, or swift.

Aire open, and at large, maketh no *Noise*, except it be sharply percussed; As in the *Sound* of a String, where *Aire* is percussed by a hard,

Experiments
in Consort
touching
Sounds; and
first teaching
the *Nature*,
and *Quality* of
Sounds.

and stiffe Body; And with a sharp loose; For if the String be not strained, it maketh no *Noise*. But where the *Aire* is pent, and straitned, there Breath, or other Blowing, (which carry but a gentle Percussion,) suffice to create *Sound*; As in *Pipes*, and *winde-Instruments*. But then you must note, that in *Recorders*, which goe with a gentle Breath, the *Concaue* of the *Pipe*, were it not for the *Fipple*, that straitneth the *Aire*, (much more than the *Simple Concaue*;) would yeeld no *Sound*. For as for other *winde-Instruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne cheeks of him that windeth them. *Organs* also are blowne with a strong winde, by the Bellows. And note againe, that some kinde of *winde-Instruments*, are blowne at a small Hole in the side, which straitneth the Breath at the first Entrance; The rather, in respect of their *Trauerse*, and *Stop* about the Hole, which performeth the *Fipples* Part; As it is seene in *Flutes*, and *Fifes*, which will not giue *Sound*, by a Blast at the end, as *Recorders*, &c. doe. Likewise in all *Whistling*, you contract the Mouth; And to make it more sharp, Men sometimes vse their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they giue no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Casting; Which Hollownesse penneth the *Aire*: Nor yet *Arrowes*, except they be ruffled in their Feathers, which likewise penneth the *Aire*. As for *Small whistles*, or *Shepherds Oaten Pipes*; they giue a *Sound*, because of their extreame Slendernesse, whereby the *Aire* is more pent, than in a *Wider Pipe*. Again, the *Voices* of *Men*, and *Liuing Creatures*, passe through the throat, which penneth the Breath. As for the *Iewes Harpe*, it is a sharp Percussion; And besides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be very softly percussed, giue no *Sound*; As when a man treadeth very softly vpon *Boards*. So *Chests* or *Doores* in faire weather, when they open easily, giue no *Sound*. And *Cart-wheeles* squeak not, when they are liquoured.

118 The *Flame* of *Tapers*, or *Candles*, though it be a swift Motion, and breaketh the *Aire*, yet passeth without *Sound*. *Aire* in *Ouens*, though (no doubt) it doth (as it were) boyle, and dilate it selfe, and is repercussed; yet it is without *Noise*.

119 *Flame percussed by Aire*, giueth a *Noise*; As in Blowing of the Fire by Bellows; Greater, than if the Bellows should blow vpon the *Aire* it selfe. And so likewise *Flame percussing the Aire strongly*, (as when *Flame* suddenly taketh, and openeth,) giueth a *Noise*; So, *Great Flames*, whiles the one impellerh the other, giue a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there should be a *white Powder*, which will discharge a Peece without *Noise*; which is a dangerous Experiment, if it should be true: For it may cause secret Murtherers. But it seemeth to me vnpossible; For, if the *Aire* pent, be driuen forth, and strike the *Aire* open, it will certainly make a *Noise*. As for the *white Powder* (if any such thing be, that may extinguish, or dead the *Noise*.)

it is like to be a Mixture of *Petre*, and *Sulphur*, without *Cause*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deadened, by discharging the *Pent Aire*, before it cometh to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more diuided *Sounds*: As if you should make a *Crosse Barrell* hollow, thorow the Barrell of a *Peece*, it may be, it would giue seuerall *Sounds*, both at the *Nose*, and at the *Sides*. But I conceiue, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the *Peece*, the *Bullet* might fly with still, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* vpon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh vpon *Open Aire*, there is no *Cause* of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as triall must be made by taking some small *Comane* of *Metall*, no more than you mean to fill with Powder; And laying the *Bullet* in the Mouth of it, halfe out into the *Open Aire*.

I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which him selfe hindred,) to haue killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*, when shee walked in *Saint James Parke*, from the Leads of the House. But thus much (no doubt) is true; That if *Burning-Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Nauy*;) the *Percussion* of the *Aire* alone, by such a *Burning-Glasse*, would make no *Noise*; No more than is found in *Comuscations*, and *Lightsnings*, without *Thunders*.

I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conueighed to the *Sense*; As well as the *Impression* of *Species visible*: Or else they will not be heard. And therefore, as the *Bullet* moueth so *swift*, that it is *Inuisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For we see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*.

All *Eruptions* of *Aire*, though small and slight, giue an *Entirety* of *Sound*; which we call *Crackling*, *Passing*, *Spitting*, &c. As in *Bay-sals*, and *Bay-leaves*, cast into the Fire; So in *Chestnuts*, when they leape forth of the Albes; So in *Greene Wood* laid vpon the Fire, especially *Rosins*; So in *Candles* that spit Flame, if they be wet; So in *Rasping*, *Sneezing*, &c. So in a *Rose-leave* gathered together into the fashion of a Purse, and broken vpon the Fore-head, or Backe of the Hand, as Children vse.

The *Cause* giuen of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Diuiding*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance: And the Motion is but a Catch of the Wit vpon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if they haue

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the *Aire* there-
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haue gotten a Pretty Expression, by a Word of Art, that Expression goeth currant; though it be empty of Matter. This Conceit of *Elision*, appeareth most manifestly to be false, in that the Sound of a Bell, String, or the like, continueth melting, some time, after the Percussion; But ceaseth straight-waies, if the Bell, or String, be touched and stayed: whereas, if it were the *Elision* of the *Aire*, that made the Sound, it could not be, that the Touch of the Bell, or String, should extinguish so suddenly that Motion, caused by the *Elision* of the *Aire*. This appeareth yet more manifestly, by *Chiming* with a Hammer, vpon the Out-side of a Bell; For the Sound will be according to the inward Concaue of the Bell; whereas the *Elision*, or Attenuation of the *Aire*, cannot be but onely betweene the Hammer, and the Out-side of the Bell. So againe, if it were an *Elision*, a broad Hammer, and a Bodkin, stricke vpon Metall, would giue a diuers Tone; As well as a diuers Loudnesse: But they doe not so; For though the Sound of the one be Louder, and of the other Softer, yet the Tone is the same. Besides, in *Echo's*, (whereof some are as loud as the Originall Voice,) there is no new *Elision*; but a *Repercussion* onely. But that which conuinceth it most of all, is; that Sounds are generated, where there is no *Aire* at all. But these and the like Conceits, when Men haue cleared their vnderstanding, by the light of Experience, will scatter, and breake vp like a Mist.

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It is certaine, that Sound is not produced at the first, but with some Locall Motion of the *Aire*, or Flame, or some other Medium; Nor yet without some Resistance, either in the *Aire*, or the Body Percussed. For if there be a meere Yeelding, or Cession, it produceth no Sound; As hath beene said. And therein Sounds differ from Light, and Colours; which passe thorow the *Aire*, or other Bodies, without any Locall Motion of the *Aire*; either at the first, or after. But you must attentiuely distinguish, betweene the Locall Motion of the *Aire*, (which is but Vehicular Cause, A Carrier of the Sounds,) and the Sounds themselues, Conueighed in the *Aire*. For as to the former, we see manifestly, that no Sound is produced (no not by *Aire* it selfe against other *Aire*, as in Organs &c.) but with a perceptible Blast of the *Aire*; And with some Resistance of the *Aire* stricken. For euen all Speech, (which is one of the gentlest Motions of *Aire*,) is with Expulsion of a little Breath. And all Pipes haue a Blast, as well as a Sound. We see also manifestly, that Sounds are carried with Wind: And therefore Sounds will be heard further with the Wind, than against the Wind; And likewise doe rise and fall with the Intension or Remission of the Wind. But for the Impression of the Sound, it is quite another Thing; And is vtterly without any Locall Motion of the *Aire*, Perceptible; And in that resembleth the Species visible: For after a Man hath lured, or a Bell is rung, we cannot discern any Perceptible Motion (at all) in the *Aire*, a long as the Sound goeth; but only at the first. Neither doth the Wind (as far as it carrieth a Voice,) with the Motion thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Variety of Words. And if a Man speake a good loudnesse, against
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the *Flame* of a *Candle*, it will not make it tremble much; though most, when those *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and some others. But *Gentle Breathing*, or *Blowing* without *speaking*, will moue the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, because as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at first; So it paralleleth in so many other things with the *Sight*, and *Radiation* of *Things visible*; Which (without all question) induce no *Locall Motion* in the *Aire*, as hath beene said.

Neuerthelesse it is true, that vpon the *Noise* of *Thunder*, and great *Ordnance*; Glasse windowes will shake; and Fishes are thought to be frayd with the Motion, caused by *Noise* vpon the water. But these Effects are from the *Locall Motion* of the *Aire*, which is a Concomitant of the *Sound*, (as hath beene said;) and not from the *Sound*.

It hath beene anciently reported, and is still receiued, that *Extreme Applauses*, and *Shouting* of *People* assembled in great Multitudes, haue so rarified, and broken the *Aire*, that *Birds* flying ouer, haue fallen downe, the *Aire* being not able to support them. And it is beleeued by some, that *Great Ringing* of *Bells* in populous Cities, hath chased away *Thunder*: and also dissipated *Pestilent Aire*: All which may be also from the Concussion of the *Aire*, and not from the *Sound*.

A very great *Sound*, neare hand, hath stricken many *Deaf*; And at the Instant they haue sound, as it were, the breaking of a *Skin* or *Parchment* in their *Eare*: And my Selfe standing neare one that *Lured* loud, and shrill, had suddenly an Offence, as if somewhat had broken, or beene dislocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hissing, but far louder, and differing;) so as I feared some *Deafenesse*. But after some halfe Quarter of an Houre it vanished. This Effect may be truly referred vnto the *Sound*: For (as is commonly receiued) an *ouer-potent Object* doth destroy the *Sense*; And *spirituall Species*, (both *Visible*, and *Audible*.) will worke vpon the Sensories, though they moue not any other Body.

In *Delation* of *Sounds*, the *Enclosure* of them preserueth them, and causeth them to be heard further. And wee finde in *Roules* of *Parchment*, or *Trunckes*, the Mouth being laid to the one end of the *Rowle* of *Parchment*, or *Truncke*, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cause* is, for that the *Sound* spendeth, and is dissipated in the *Open Aire*; But in such *Concaues* it is conserued, and contracted. So also in a *Peece* of *Ordnance*, if you *speak* in the *Touch-hole*, and another lay his *Eare* to the Mouth of the *Peece*, the *Sound* passeth, and is farre better heard, than in the *Open Aire*.

It is further to be considered, how it proueth and worketh, when the *Sound* is not enclosed all the Length of his Way, but passeth partly through open *Aire*; As where you *speake* some distance from a *Truncke*; or where the *Eare* is some distance from the *Truncke*, at the other End; Or where both *Mouth* and *Eare* are distant from the *Truncke*. And

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it is tried, that in a long *Truncke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from abroad, than abroad from within the *Chamber*.

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As the *Enclosure*, that is *Round about and Entire*, preferueth the *Sound*; So doth a *Semi-Concave*, though in a lesse degree. And therefore, if you diuide a *Truncke*, or a *Cave* into two, and one speake at the one end, and you lay your *Eare* at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like vpon the *Mast* of a *Ship*, or a long *Pole*, or a *Pece* of *Ordnance* (though one speake vpon the *Surface* of the *Ordnance*, and not at any of the *Bores*;) the *Voice* will be heard further, than in the *Aire* at large.

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It would be tried, how, and with what proportion of disadvantage, the *Voice* will be carried in an *Horne*, which is a line *Arched*; Or in a *Trumpet*, which is a line *Retorted*; Or in some *Pipe* that were *Sinuuous*;

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It is certaine, (howsoever it crosse the Receiued Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the most fauourable *Deferent* of *Sounds*. Take a *Vessell* of *Water*, and knap a paire of *Tongs* some depth within the *Water*, and you shall heare the *Sound* of the *Tongs* well, and not much diminished; And yet there is no *Aire* at all present.

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Take one *Vessell* of *Siluer*, and another of *Wood*, and fill each of them full of *Water*, and then knap the *Tongs* together, as before, about an handfull from the *Bottom*, and you shall finde the *Sound* much more *Resounding* from the *Vessell* of *Siluer*, than from that of *Wood*: And yet if there be no water in the *Vessell*, so that you knap the *Tongs* in the *Aire*, you shall finde no difference, betweene the *Siluer* and *Woodden Vessell*. Whereby, beside the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communiceth with the *Bottom* of the *Vessell*: The other, that such a *Communication* passeth farre better, thorow *Water*, than *Aire*.

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Strike any *Hard Bodies* together, in the *Middelt* of a *Flame*, and you shall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

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The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath some *Affinity* with the *Aire*, performeth, in some degree, the *Parts* of the *Aire*; As when you knocke vpon an *Emptie Barrell*, the *Sound* is (in part) created by the *Aire* on the *Out-side*; And (in part) by the *Aire* in the *In-side*; For the *Sound* will be greater or lesser, as the *Barrell* is more *Emptie*, or more full; But yet the *Sound* participateth also with the *Spirit* in the *Wood*, thorow which it passeth, from the *Outside* to the *In-side*: And so it commeth to passe, in the *Chiming* of *Bells*, on the *Out-side*; where also the *Sound* passeth to the *In-side*: And a number of o-

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thes like Instances, whereof we shall speake more, when we handle the *Communication of Sounds*.

It were extreame Grossnesse to thinke, (as wee haue partly touched before,) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Febacula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returns* or *Results* of the *String*, which was strained by the *Touch*, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first *Motion*, is soft and dull, So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*.

Take a *Truncke*, and let me whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs giue greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserve *Sound*, but also Encrease and Sharpen it.

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards hauing more Roome to spread at the greater End; doe dilate themselves; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And euen *Hunters Hornes*, which are sometimes made straight, and not Oblique, are euer greater at the lower end. It would be tried also in *Pipes*, being made far larger at the lower End: Or being made with a *Belly* towards the lower End, And then issuing into a straight Concaue againe.

There is in *Saint James Fields*, a *Conduit* of *Bricke*, vnto which ioyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a *Window*; And in the *Round House* a *Slit* or *Rift* of some little breadth: If you crie out in the *Rift*, it will make a fearfull Roaring at the *Window*. The *Cause* is the same with the former; For that all *Concaues*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out.

Hawkes Bells, that haue Holes in the Sides, giue a greater Ring, than if the *Pellet* did strike vpon *Brasse*, in the *Open Aire*. The *Cause* is the same with the first *Instance* of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* vnspent, and more strong.

In *Drums*, the Closenesse round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike vpon the like *Skin*, extended

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tended in the Open Aire. The *Cause* is the same with the two precedent.

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Sounds are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cause* is, for that in the *Day*, when the *Aire* is more *Thin*, (no doubt) the *Sound* pierceth better; But when the *Aire* is more *Thicke*, (as in the *Night*) the *Sound* spendeth and spreadeth abroad lesse: And so it is a Degree of *Enclosure*. As for the *Night*, it is true also, that the Generall Silence helpeth.

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There be two Kinds of *Reflexions* of *Sounds*; The one at *Distance*, which is the *Echo*; Wherein the *Originall* is heard distinctly, and the *Reflexion* also distinctly; Of which we shall speake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly vpon the *Originall*, and so iterateth it not, but amplifieth it. Therefore we see, that *Musicke* vpon the water soundeth more; And so likewise *Musicke* is better in *Chambers* *Wainscoted*, than *Hanged*.

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The *Strings* of a *Lute*, or *Violl*, or *Virginals*, doe giue a far greater *Sound*, by reason of the *Knot*, and *Board*, and *Concaue* underneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the *Vpper Aire* into the *Lower*. The *Cause* is, the *Communication* of the *Vpper Aire* with the *Lower*; And *Penning* of both from *Expende*, or *Dispersing*.

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An *Irish Harpe* hath *Open Aire* on both sides of the *Strings*: And it hath the *Concaue* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more *Resounding Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which haue likewise *Wire-strings*. I iudge the *Cause* to be, for that *Open Aire* on both Sides helpeth, so that there be a *Concaue*; Which is therefore best placed at the End.

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In a *Virginal*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cause* is, for that all *Shutting in* of *Aire*, where there is no competent *Vent*, dampeth the *Sound*. Which maintaineth likewise the former *Instance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* somewhat.

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There is a *Church* at *Glocester*, (and as I haue heard the like is in some other places;) where if you speake against a *VWall*, softly, another shall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the *Frame* of that *Place*. I suppose there is some *Vault*, or *Hollow*, or *Isle*, behinde the *Wall*, and some *Passage* to it towards the further end of that *Wall*, against which you speake; So as the *Voice*, of him that speaketh, slideth along the *Wall*, and then entreth at some *Passage*, and communicateth with the *Aire* of the *Hollow*; For it is preferred somewhat by the *plaine wall*; but that is too weake to giue a *Sound Audible*, till it hath communicated with the backe *Aire*.

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Strike vpon a *Bowstring*, and lay the *Horne* of the *Bow* neare your *Eare*, and it will encrease the *Sound*, and make a degree of a *Tone*. The *Cause* is, for that the *Sensory*, by reason of the *Close Holding*, is per-
cussed,

cuffed, before the Aire disperfeth. The like is, if you hold the *Horne* betwixt your Teeth, But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse betwene thofe two Parts; As appeareth by this; That a Harfh *Grating Tune* feteth the Teeth on edge. The like falleth out, if the *Horne* of the *Blow* be put vpon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, and strike vpon the other, it maketh a far greater *Sound*, than the like Stroke vpon the *Rod*, nor fo made Contiguous to the Eare. By which, and by fome other *Instances*, that haue beene partly touched, it fhould appeare; That *Sounds* doe not onely slide vpon the Surface of a Smooth Body, but doe alfo communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinity Colledge* in *Cambridge*, there was an *Upper Chamber*, which being thought weake in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middelt of the *Chamber*; Which if you had strucke, it would make a little flat Noife in the *Roome* where it was strucke; But it would make a great Bombe in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *Well*, when they touch vpon the *Water*; Or when they strike vpon the fide of the *Well*; Or when two Buckets dafh the one againft the other; Thefe *Sounds* are deeper, and fuller, than if the like Percuffion were made in the *Open Aire*. The *Cause* is, the Penning and Enclofure of the Aire, in the Concaue of the *Well*.

Barrells placed in a *Roome* vnder the Floare of a *Chamber*, make all *Noifes* in the fame Chamber, more Full and Refounding.

So that there be five wayes (in generall,) of Maioration of Sounds: Enclofure Simple; Enclofure with Dilatation; Communication; Reflexion Concurrent; and Approach to the Senfory.

For *Exility* of the *Voice*, or other *Sounds*: It is certaine, that the *Voice* doth paffe thorow *Solide* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Clofe Body, and fuch an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by fuch paffage, to a great *Weakenesse*, or *Exility*. If therefore you ftop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noife, or Rattle. And fo doth the *Affitter*, or *Eagles Stone*, which bath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, and take a *Paile*, and turne the Bottome vpwrd, and carry the Mouth of it, (Euen,) downe to the Leuell of the *Water*; and fo preffe it downe vnder the *Water*, fome handfull and an halfe, ftill keeping it euen, that it may not tilt on either fide, & fo the Aire get out: Then let him that is in the *Bath*, diue with his Head fo far vnder *Water*, as he may put his Head into the *Paile*; & there wil come as much *Aire* bubling forth, as wil make

Roome

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Roome for his Head. Then let him speak; and any that shal stand without, shal heare his *Voice* plainly; but yet made extreme sharp and exile, like the *Voice* of *Puppets*: But yet the *Articulate Sounds* of the *Words* will not be cō-founded. Note that it may be much more handfomely done, if the *Pail* be put ouer the Mans head about Water; and then he cower downe, and the *Pail* be pressed downe with him. Note that a Man must kneele or sit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he saith; That *Hercules Page Hylas* went with a *Water-pot*, to fill it at a pleasant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in loue with the Boy, and pulled him vnder *Water*, keeping him aliuē; And that *Hercules* missing his *Page*, called him by his Name, aloud, that all the Shore rang of it; And that *Hylas* from within the *Water*, answered his Master; But (that which is to the present purpose) with so small and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was fast by.

156 In *Lutes*, and *Instruments* of *Strings*, if you stop a *String* high, (whereby it hath lesse Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and strike the Edge of the one against the Bottome of the other, within a *Pail* of *Water*; And you shall finde, that as you put the *Sawcers* lower, and lower, the *Sound* groweth more flat; euen while Part of the *Sawcer* is about the *Water*; But that Flatnesse of *Sound* is ioyned with a Harshnesse of *Sound*; which (no doubt) is caused by the Inequalitye of the *Sound*, which commeth from the Part of the *Sawcer* vnder the *Water*, and from the Part about. But when the *Sawcer* is wholly vnder the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard*; As if a *Bell* hath Cloth, or Silke wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the *Keyes* are lined; And in *Colledges* they vse to line the *Tablemen*.

159 Triall was made in a *Recorder*, after these seuerall manners. The Bottome of it was set against the Palme of the Hand; stopped with Wax round about; set against a Damaske Cushion; Thrust into Sand; Into Ashes; Into Water, (halfe an Inch vnder the Water;) Close to the Bottome of a Siluer Basin; And still the *Tone* remained: But the Bottome of it was set against a Woollen Carpet; A Lining of Plush; A Locke of Wooll, (though loosely put in;) Against Snow; And the *Sound* of it was quire deaded, and but Breath.

160 Iron Hot produceth not so full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and lesse Refounding. So likewise Warme Water, when it falleth, maketh not so full a *Sound*, as Cold: And I conceiue it is softer, and neerer the Nature of Oyle; For it is more slippery; As may be perceiued, in that it scowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The

Trunke

Truncke of it of the length of two *Reverbers*, and the Holes answerable toward each end; And let two play the same Lesson vpon it, at an *Vnison*; And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two *Trunckes* (thorow-out) hollow; And let two speake, or sing, the one long-waies, the other traaverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also giue light to the *Mixture* of *Sounds*; wherof we shall speake hereafter.

A *Bellows* blowne in at the *Hole* of a *Drum*, and the *Drum* then stricken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the *Aire*, being blowne together, lesse moueable.

The *Loudnesse*, and *Sofinesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exility* of *Sounds*; For a *Base String*, though softly stricken, giueth the greater *Sound*; But a *Treble String*, if hard stricken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more *Aire*; And the *Treble* lesse *Aire*, but with a sharper *Percussion*.

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Sofinesse* of *Sounds*: As in knocking harder or softer; Winding of a *Horne* stronger or weaker; Ringing of a *Hand-bell* harder or softer, &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a *Cloth*, it will giue a lesse *Sound*; If against *Wood*, a greater; If against *Metall*, yet a greater; And in *Metals*, if you strike against *Gold*, (which is the more pliant,) it giueth the flatter *Sound*; If against *Siluer*, or *Brasse*, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peerce*, what a great Noise it maketh. We see also, that the Charge with *Bullet*; Or with *Paper* wet, and hard stopped; Or with *Powder* alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report.

The *Sharpnesse* or *Quicknesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a *Whip*, or *VVand*, if you strike the *Aire* with it; the Sharper and Quicker you strike it, the *Louder Sound* it giueth. And in playing vpon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the *Aire* speedily; whereas the Soft Striking doth rather beat, than cut.

The *Communication* of *Sounds* (as in *Bellies* of *Lutes*, *Empiry Vessells*, &c.) hath beene touched obiter, in the *Maioration* of *Sounds*: But it is fit also to make a *Title* of it apart.

162

Experiments in Confort touching the *Loudnesse* or *Sofinesse* of *Sounds*; and their Carriage at longer or shorter Distance.

163

164

165

Experiments in Confort touching the *Communication* of *Sounds*.

The

166

The Experiment for greatest Demonstration of Communication of Sounds, is the *Chiming of Bells*; where if you strike with a Hammer vpon the Vpper Part, and then vpon the Midst, and then vpon the Lower, you shall finde the Sound to be more Treble, and more Base, according vnto the Concaue, on the Inside; though the Percussion be onely on the Outside.

167

When the Sound is created betweene the Blast of the Mouth, and the Aire of the Pipe, it hath neuerthelessse some Communication with the Matter of the Sides of the Pipe, and the Spirits in them contained; for in a Pipe, or Trumpet, of Wood, and Brasse, the Sound will be diuers; So if the Pipe be covered with Cloth, or Silke, it will giue a diuers Sound, from that it would doe of it selfe; So, if the Pipe be a little wet on the Inside, it will make a differing Sound, from the same Pipe dry.

168

That Sound made within Water, doth communicate better with a hard Body thorow Water, than made in Aire, it doth with Aire; Vide Experimentum, 134.

Experiments
in Consort touching
Equality,
and Inequality
of Sounds.

We haue spoken before (in the Inquisition touching Musicke,) of Muscicall Sounds, wherunto there may be a Concord or Discord in two Parts; Which Sounds we call Tones: And likewise of Immuscicall Sounds; And haue giuen the Cause, that the Tone proceedeth of Equality, and the other of Inequality. And we haue also expressed there, what are the Equall Bodies that giue Tones, and what are the Vnequall that giue none. But now we shall speake of such Inequality of Sounds, as proceedeth, not from the Nature of the Bodies themselues, but is Accidentall; Either from the Roughnesse, or Obliquity of the Passage; Or from the Doubling of the Percutient; Or from the Trepidation of the Motion.

169

A Bell, if it haue a Rife in it, whereby the Sound hath not a cleare Passage, giueth a Hoarse and larring Sound; So the Voice of Man, when by Cold taken the Wesill groweth rugged, and (as we call it) furred, becommeth hoarse. And in these two Instances, the Sounds are Ingrate; because they are meere Vnequall: But, if they be Vnequall in Equality, then the Sound is Gratefull, but Purling.

170

All Instruments, that haue either Returnes, as Trumpets; Or Flexions, as Cornets; Or are Drawne up, and put from, as Sackbuts; haue a Purling Sound: But the Recorder, or Flute, that haue none of these Inequalities, giue a cleare Sound. Neuerthelessse, the Recorder it selfe, or Pipe moistened a little in the Inside, soundeth more solemnly, and with a little Purling, or Hissing. Again, a Wreathed String, such as are in the Base Strings of Bandores, giueth also a Purling Sound.

171

But a Lute-string, if it be meere Vnequall in his Parts, giueth a Harsh and

and *Vntuneable Sound*; which *Strains* we call *False*, being bigger in one Place than in another; And therefore *False Strings* are neuer *False*. We see also, that when we try a *False Lute string*, wee vie to extend it hard betwene the fingers, and to fillip it; And if it giueth a double *Strains*, it is *True*; But if it giueth a treble, or more, it is *False*.

Waters, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Organs*, (where they haue a *Pipe*, they call the *Noisingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling; And Children haue also little Things they call *Cockes*, which haue *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*: Which *Trembling of Water*, hath an affinity with the Letter *Z*. All which *Inequalities of Trepidation*, are rather pleasant, than otherwise.

All *Base Notes*, or very *Treble Notes*, giue an *Asper Sound*; For that the *Base* striketh more *Aire*, than it can well stroke equally; And the *Treble* cutteth the *Aire* so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

We know Nothing, that can at pleasure make a *Musicall*, or *Immusical Sound*, by voluntarie *Motion*, but the *Voice of Man*, and *Birds*. The Cause is, (no doubt) in the *Weatill* or *Wind-pipe*, (which we call *Aspera Arteria*.) which being well extended, gathereth *Equality*; As a *Bladder* that is wrinkled, if it be extended, becommeth smooth. The Extension is alwaies more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can neuer giue *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the *Throat*, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the *Chinne*, when we sing.

The *Humming of Bees*, is an *Unequall Buzzing*; And is conceined, by some of the *Ancients*, not to come forth at their Mouth, but to be an *Inward Sound*, But (it may be) it is neither; But from the motion of their *Wings*; For it is not heard but when they stirre.

All *Metalls quenched in Water*, giue a *Sibilation* or *Hissing Sound*; (which hath an Affinity with the letter *Z*.) notwithstanding the *Sound* be created betwene the *Water* or *Vapour*, and the *Aire*. Soething also, if there be but small Store of *Water*, in a *Vessell*, giueth a *Hissing Sound*; But *Boyling* in a full *Vessell* giueth a *Bubbling Sound*, drawing somewhat neare to the *Cocks* vsed by Children.

Triall would be made, whether the *Inequality*, or *Interchange* of the *Medium*, will not produce an *Inequality of Sound*; As if three *Bells* were made one within another, and *Aire* betwixt Each; And then the outermost *Bell* were chimed with a *Hammer*, how the *Sound* would differ from a *Simple Bell*. So likewise take a *Plate of Brasse*, and a *Plincke of Wood*, and ioyne them close together, and mock you in one of them, and see if they doe not giue an *unequall Sound*. So make two or three *Partitions of Wood in a Hoofhead*, with *Holes* or *Knots* in them; And marke the difference of their *Sound*, from the *Sound* of an *Hoghead*, without such *Partitions*.

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Experiments
in Consort,
touching the
more Treble, and
the more Base
Tones, or Musi-
call Sounds.

178

It is euident, that the *Percussion* of the *Greater Quantity of Aire*, causeth the *Baser Sound*; And the lesse *Quantity*, the more *Treble Sound*. The *Percussion* of the *Greater Quantity of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concaue*, by which the *Sound* passeth; and by the *Longitude* of the same *Concaue*. Therefore we see that a *Base string*, is greater than a *Treble*; A *Base pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the *Note Holes* be, and the further off from the *Mouth* of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the *Mouth*, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the *Top*, it maketh a more *Treble Sound*; And at the *Bottom* a *Baser*.

179

It is also euident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heauier*, the more *Base Sound*. So we see in *Strings*; the more they are wound vp, and strained; (And thereby giue a more quicke Start-backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound vp, the *Baser* is the *Sound*. And therefore a *Bigger String* more strained, and a *Lesser String*, lesse strained, may fall into the same *Tone*.

180

Children, Women, Eunuchs haue more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* haue greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing the Voice*, at the yeares of Puberty, is more obscure. It seemeth to be, for that when much of the Moisture of the Body, which did before irrigate the Parts, is drawne downe to the Spermatick vessells; it leaueth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilosity, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c.

181

The Industry of the *Musitian*, hath produced two other Meanes of *Strayning*, or *Intension of Strings*, besides their *Winding vp*. The one is the *Stopping* of the *String* with the *Finger*; As in the Necks of *Lutes*, *Viols*, &c. The other is the *Shortnesse* of the *String*; As in *Harps*, *Virginalls*, &c. Both these haue one, and the same reason; For they cause the *String* to giue a quicker Start.

182

In the *Strayning* of a *String*, the further it is strained, the lesse *Superstrayning* goeth to a *Note*; For it requireth good *Winding* of a *String*, before it will make any *Note* at all: And in the *Stops* of *Lutes*, &c. the higher they goe, the lesse Distance is betweene the *Frets*.

183

If you fill a *Drinking-Glasse* with *Water*, (especially one Sharp below, and Wide above,) and fillip vpon the Brim, or Outside; And after empty Part of the *Water*, and so more and more, and still try the *Tone* by *Filipping*; you shall finde the *Tone* fall, and be more *Base*, as the *Glasse* is more Empty.

The Iust and Measured *Proportion* of the *Aire Percussed*, towards the *Baseness* or *Trebleness* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Unison*, and *Diapason*; Which we haue touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may be found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

Try therefore the *Winding* of a *String* once about, as soone as it is brought to that Extension as will giue a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *Winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained, But note that to measure this, the way will be, to take the Length in a right Line of the *String*, vpon any *Winding* about of the Pegge.

As for the *stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first *Stop* of the *String*, vnto such a *Stop* as shall produce a *Diapason* to the former *Stop*, vpon the same *String*.

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* euery one giueth. But still in these three last *Instances*, you must diligently obserue, what *length* of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giueth the aptest demonstration,) you must set downe what Encrease of *Concave* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so vp to the *Diapason*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not vnlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell foundlers* in fitting the tune of their *Bells*. So that Enquiry may saue *Triall*. Surely, it hath beene obserued by one of the *Ancients*, that an *Empty Barrell* knocked vpon with the finger, giueth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well vnderstand; For that the knocking of a *Barrell full*, or *Empty*, doth scarce giue any *Tone*.

Experiments
in Confort
touching the
Proportion of
Treble and Base
Tones.

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There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the *Passive*: And that it be not too neare, but at a distance. For in a *Recorder*, the three vpper-most Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the *Winding* or *Stopping* of *Strings*.

Experiments
in Consort
touching Exte-
riour, and Inte-
riour Sounds.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musical*, nor *Immusical*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may be both *Musical* and *Immusical*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Emission* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth; as a *Blow* differeth from a *Cut*.

188

In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*.) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can neuer make a *Tone*, nor sing in *Whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowses*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Cane*, (though soft) is an *Exteriour*. So likewise, the greatest *Winds*, if they haue no *Concussion*, or blow not hollow, giue an *Interiour Sound*; The *Whistling* or hollow *Wind* yeeldeth a *Singing*, or *Exteriour Sound*; The former being pent by some other *Body*; The latter being pent in by his owne *Density*: And therefore we see, that when the *Wind* bloweth hollow, it is a *Signe* of *Raine*. The *Flame*, as it moueth within it selfe, or is blowne by a *Bellowses*, giueth a *Murmur* or *Interiour Sound*.

189

There is no *Hard Body*, but stricke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the *Percussion* be ouer soft, it may induce a *Nullity* of *Sound*; But neuer an *Interiour Sound*; As when one treadeth so softly, that he is not heard.

190

Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it neuer giueth an *Exteriour Sound*; As if you blow strongly with a *Bellowses* against a *Wall*.

191

Sounds (both *Exteriour* and *Interiour*.) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments
in Consort,
touching Arti-
culation of
Sounds.

192

It is eident, and it is one of the strangest *Secrets* in *Sounds*, that the *whole Sound* is not in the *whole Aire* onely; But the *whole Sound* is also in euery small *Part* of the *Aire*. So that all the curious *Diuersity* of *Articulate*

small Sounds, of the Voice of Man, or Birds, will enter at a small Cranny, Inconfused.

The *Frequent Agitation* of the *Winds*, and the like, though they be material to the Carriage of the *Sounds*, further, or lesse way; yet they doe not confound the *Articulation* of them at all, within that distance that they can be heard; Though it may be, they make them to be heard lesse Way, than in a Still; as hath beene partly touched.

Out-great Distance confoundeth the *Articulation* of *Sounds*. As we see, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot distinguish what he saith. And one *Articulate Sound* will confound another; As when many speake at once.

In the *Experiment* of *Speaking under Water*, when the Voice is reduced to such an Extreme Exaltity, yet the *Articulate Sounds*, (which are the *Words*.) are not confounded; as hath beene said.

I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*. But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Interfusing*: And although (as was formerly said) a *Sound Articulate*, already created, will be contracted into a small Cranny; yet the full *Articulation* requireth more Dimension.

It hath beene observed, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewise in the Rooft, a Preacher cannot be heard so well, as in the like Places not so Vaulted. The Cause is, for that the *Subsequent Words* come on, before the *Precedent words* vanish: And therefore the *Articulate Sounds* are more confused, though the *Grosse* of the *Sound* be greater.

The *Movements* of the *Tongue*, *Lips*, *Throat*, *Palat*, &c. which goe to the *Making* of the several *Alphabetical Letters*, are worthy Enquiry and pertinent to the present *Inquisition* of *Sounds*: But because they are subtil, and long to describe, we will refer them over, and place them amongst the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have assigned, which *Letters* are *Labiall*, which *Dental*, which *Guttural*, &c. As for the *Latines*, and *Greekes*, they have distinguished betweene *Seem-vowels*, and *Mutes*; And in *Mutes*, betweene *Mute & Tenues*, *Media*, and *Aspirata*; Not amiss; But yet not diligently enough. For the speciall *Strokes*, & *Movements*, that create those *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expressed, but with the *Contracting*, or *Whetting* of the *Mouth*; That the *Letters N. and B.* cannot be pronounced, but that the *Letter R.* will turne into *M.* As *Heutenba*, will be *Heutenba*. That *M. and T.* cannot be pronounced together, but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the *Making* of the whole *Alphabet*, there will be fewer *Simple Movements* required, than there are *Letters*.

The *Lungs* are the most Spongy Part of the Body; And therefore ablest to contract, and dilate it selfe: And where it contracteth it selfe,

it

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it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallate*, and the rest of those they call *Instruments* of *voice*.

There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that haue no *Voice Articulate*; and diuers *Letters* of *Articulate Voices*: And commonly Men haue given such Names to those *Sounds*, as doe allude vnto the *Articulate Letters*. As *Trembling* of *Water* hath Resemblance with the *Letter L*; *Quenching* of *Hot Mettalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noise* of *Scratchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dyphthong Eu*; *Voice* of *Cuckoes*, with the *Dyphthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet*, or other Dead Body, to pronounce a *Word*; Let him consider, on the one Part, the Motion of the *Instruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

NATV-

NATVRALL HISTORIE.

III. Century.



ALL *Sounds* (whatsoever) moue Round; That is to say; On all Sides; *Vpwards*; *Downwards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

Sounds doe not require to bee conueyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may be *Arch*ed; Though it be true, they moue strongest in a *Right Line*; Which neuerthelesse is not caused by the *Rightnesse* of the *Line*, but by the *Shortnesse* of the distance; *Linea recta breuissima*. And therefore we see, if a *Wall* be betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Archeth* ouer the *Wall*.

If the *Sound* be *Stopped* and *Repercuſed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one side of the *Boot* be downe, and the other *vp*; And a *Begger* beg on the *Cloſe Side*; you wouldest thinke that he were on the *Open Side*. So likewise, if a *Bell* or *Clocke*, be (for Example) on the *North-side* of a *Chamber*; And the *Window* of that *Chamber* be vpon the *South*; He that is in the *Chamber*, will thinke the *Sound* came from the *South*.

Sounds, though they spread round, (so that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they moue strongest, and goe furthest in the *Fore-lines*, from the first *Locall Impulsion* of the *Aire*. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better, before the *Pulpit*, than behinde it, or on the *Sides*, though it stand open. So a *Harquebuz*, or *Ordnance*, will be further heard, forwards, from the *Mouth* of the *Peece*, than backwards, or on the *Sides*.

It may bee doubted, that *Sounds* doe moue better, *Downwards* than

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Experiments
in Conſerre,
touching the
Motions of
Sounds, in what
Lines they are
Circular, Ob-
lique, Straight;
Vpwards, down-
wards; For-
wards, Back-
wards.

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than Vpwards, *Pulpits* are placed high above the People. And when the Ancient *Generalls* spake to their Armies, they had euer a Mount of Turfe cast vp, whereupon they stood: But this may be imputed to the Stops and Obstacles, which the voice meeteth with when one speaketh vpon the leuell. But there seemeth to be more in it: For it may bee, that *Spirituall species*, both of *Things Visible* and *Sounds*, doe moue better *Downwards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of *Pauls*, seeme much lesse then they are, and cannot bee knowne; But to Men aboue, those below seeme nothing so much lessened, and may bee knowne: yet it is true, that all things to them aboue, seeme also somewhat contracted, and better collected into Figure: as *Knots in Gardens* shew best from an Vpper window, or *Tarras*.

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But to make an exact Triall of it, let a Man stand in a *Chamber*, not much aboue the Ground, and speake out at the window, through a *Truncke*, to one standing on the Ground, as softly as he can, the other laying his Eare close to the *Truncke*: Then *vis à versa*, let the other speake below keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Truncke*: And this may be the aptest Meanes, to make a Iudgement, whether *Sounds* descend, or ascend, better.

Experiments
in Colours touch-
ing the Lifting
and Persuading
of Sounds;
in which the
the 1st they
require to
be 6th and 11th

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After that *Sound* is created, (which is in a moment,) wee finde it continueth some small time, melting by little and little. In this there is a wonderfull Errour amongst Men, who take this to be a *Continuance* of the First *Sound*; whereas (in truth) it is a *Renouation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String stricken, which is thought to be a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as euer the Iacke falleth, and toucheth the String, the Sound ceaseth; And in a Bell, after you haue chimed vpon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish, that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Penfile: The other Secret, of the Minute Parts; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while, after you haue played; But that is but while the Bellowes are in Falling.

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It is certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will be carried, (at the least) twenty Miles vpon the land, and much further vpon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or more later. This must needs be a *Continuance* of the First *Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordinance* would not extinguish the *Sound* the sooner : So that in great *Sounds* the *Continuance* is more than Momentany.

To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and haue with him a Taper ; And let some Vaile be put before the Taper ; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell ; And in the same Instant withdraw the Vaile ; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. Th s may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

It is generally knowne and obserued, that *Light*, and the *Object* of *Sight*, moue swifter than *Sound* ; For we see the *Flash* of a Piece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted vp for a second Stroke, before he heare the Noise of the first. And the greater the Distance, the greater is the Preuention : As we see in Thunder, which is farre off ; where the Lightning Precedeth the Cracke a good space.

Colours, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength ; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire* ; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sine quâ non*.) in that, it perisheth so suddenly ; For in euery Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe ; which the *Water* also doth, but nothing so swiftly.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the Sides* of a Body, for the *Passing thorow* a Body : And therefore you must make the *Intercepting Body* very close ; For *Sound* will passe thorow a small Chincke.

Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water* ; thorow a *Wall* ; thorow *Mettall*, as in Hawkes Bells stopped ; &c.) the *Hard*, or *Close Body*, must be but thinne and small ; For else it deadeth and extinguisheth the *Sound* vterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the Voice must not be very deepe within the *Water* : For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard : And if there were an Hoghead emptie, whereof the Sides were some two Foot thicke, and the Bung hole stopped ; I conceiue the Resounding *Sound*, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none ; But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

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Experiments in Consort, touching the *Passage* and *Interceptions* of *Sounds*.

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It is certaine, that in the *Passage of Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are stricke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped vp, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell giue any *Sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse haue a great Belly; left when you shake the Bell, it dash vpon the Sides of the Glasse.

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It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard ouer a wall, will not be heard ouer a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close vnder the Wall.

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Soft and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sounds*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As wee see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windows, if they be very Close, will checke a *Sound* more, than the like Thickness of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts; and Skin.

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It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells,) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confus'd; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments
in Cosort tou-
ching the Me-
dium of Sounds.

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The *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and vnapt *Deferents*, except the *Aire*.

In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Euening Sounds*; And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the Title of *Maioration* of *Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserveth the *Sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

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How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tried, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

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Whether any other *Liquours*, being made *Mediums*, cause a Diuer-
sity of *Sound* from *Water*, it may be tried: As by the Knapping of the
Tongs; Or Striking of the Bottome of a vessell, filled either with Milke,

OR

or with Oyle ; which though they be more light, yet are they more vnequall Bodies than Aire.

Of the Natures of the Mediums, we haue now spoken ; As for the Disposition of the said Mediums, it doth consist in the Penning, or not Penning of the Aire ; Of which we haue spoken before, in the Title of Delation of Sounds : It consisteth also in the Figure of the Concaue, through which it passeth ; Of which we will speake next.

How the *Figures of Pipes, or Concaues*, through which *Sounds* passe ; Or of other *Bodies deferent* ; conduce to the Varietie and Alteration of the *Sounds*; Either in respect of the *Greater Quantitie*, or *lesse Quantitie* of *Aire*, which the *Concaues* receiue ; Or in respect of the *Carrying* of *Sounds* longer or shorter way ; Or in respect of many other *Circumstances* ; they haue beene touched, as falling into other *Titles*. But those *Figures*, which we now are to speake of, wee intend to be, as they concerne the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

The *Figure* of a *Bell* pertaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Munters Horne*, and *Cornet*, is oblique ; yet they haue likewise *Straight Hornes* ; which if they be of the same Bore with the *Oblique*, differ little in *Sound* ; Saue that the *Straight* require somewhat a stronger Blast. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are *Straight* ; But the *Recorder* hath a lesse Bore, and a greater ; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S* : which maketh that *Purling Sound*, &c. Generally, the *Straight Line* hath the cleaneest and roundest *Sound*, And the *Crooked* the more Hoarse, and larring.

Of a *Sinuous Pipe*, that may haue some foure Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the midst. And so likewise of an *Angular Pipe* : And see what will be the Effects of these seuerall *Sounds*. And so againe of a *Circular Pipe* ; As if you take a *Pipe* perfect Round, and make a Hole whereinto you shall blow ; And another Hole not farre from that ; But with a Trauerse or Stop betweene them ; So that your Breath may goe the Round of the Circle, and come forth at the second Hole. You may trie likewise *Percussions* of *Solide Bodies* of seuerall *Figures* ; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations* ; As *Flat* against *Flat* ; And *Conuex* against *Conuex* ; And *Conuex* against *Flat*, &c. And marke well the diuersities of the *Sounds*. Trie also the difference in *Sound* of seuerall *Crafsitudes* of *Hard Bodies* percussed ; And take knowledge of the diuersities of the *Sounds*. I my selfe haue tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Silver*, or *Brasse*, but rather better : yet wee see that a

Experiments
in Confort,
what the *Figures* of the
Pipes, or *Concaues*, or the
Bodies Deferent
conduce to the
Sounds.

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piece of Money of Gold soundeth farre more flat than a peece of Money of Silver.

- 223 The Harpe hath the *Concaue*, not along the *Strings*, but acrosse the *Strings*: And no Instrument hath the *Sound* so Melting, and Prolonged, as the Harpe hath. So as I suppose, that if a *Virginal* were made with a double *Concaue*, the one all the length as the *Virginal* hath; the other at the End of the *Strings*, as the Harpe hath; It must needs make the *Sound* sweeter, and not so Shallow, and farring. You may trie it, without any Sound Board along, but only Harpe-wise, at one End of the *Strings*: Or Idly with a double *Concaue*, at Each end of the *Strings* one.

Experiments
in Confort
touching the
Mixture of
Sounds.

- 224 There is an apparent Diversitie betweene the *Species Visible*, and *Audible*, in this; That the *Visible* doth not mingle in the *Medium*, but the *Audible* doth. For if wee looke abroad, wee see Heauen, a number of Stars, Trees, Hills, Men, Beasts, at once. And the *Species* of the one doth not confound the other. But if so many *Sounds* came from severall Parts, one of them would yetterly confound the other. So wee see, that *Voices* or *Consorts* of *Musicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true neuertheless, that a great *Light* drowneth a smaller, that it cannot be seene; As the *Sunne* that of a *Glowworme*; as well as a Great *Sound* drowneth a lesser. And I suppose likewise, that if there were two *Lanthorns* of Glasse, the one a *Crimsin*, and the other an *Azure*, and a Candle within either of them, those Coloured Lights would mingle, and cast vpon a White Paper a Purple Colour. And euen in *Colours*, they yeld a faine and weake *Mixture*: For white walls make *Roomes* more lightfull, than blacke, &c. But the Cause of the *Confusion* in *Sounds*, and the *Inconfusion* in *Species Visible*, is, For that the *Sight* worketh in Right Lines, and maketh severall *Cones*; and so there can be no Coincidence in the Eye, or Visuall Point: But *Sounds*, that moue in *Oblique* and *Arcuate* Lines, must needs encounter, and disturbe the one the other.

- 225 The sweetest and best *Harmony* is, when euery *Part*, or *Instrument*, is not heard by it selfe, but a Confusion of them all; Which requireth to stand some distance off. Euen as it is in the *Mixture* of *Perfumes*; Or the Taking of the Smells of severall *Flowers* in the *Aire*.

- 226 The *Disposition* of the *Aire*, in other *Qualities*, except it be ioyned with *Sound*, hath no great Operation vpon *Sounds*: For whether the *Aire* be lightsome or darke, hot or cold, quiet or stirring, (except it be with *Nose*) sweet-smelling, or stinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

- 227 But *Sounds* doe disturbe and alter the one the other: Sometimes the one drowneth the other, and making it not heard; Sometimes the one farring and discording with the other, and making a *Confusion*; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

- 228 Two *Voices* of like lowdnesse, will not be heard, twice as farre, as one
of

of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound. But it seemeth that the *Impressions* from the *Object's* of the *Senses*, doe mingle themselves, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may lie, because the first *Impression*, which is from *Praeterea ad Alia*, (As from *Silence* to *Noise*, or from *Darknesse* to *Light*.) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that arguement may be; For that the *Aire*, after it hath receiued a Charge, doth not receiue a Second charge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of *Virtue*, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

All *Reflexions* *Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Original *Sound*, or the *Reflexion*, be cleane and Smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Pioll*, with the Belly of polished *Brasse*, in stead of *Wood*. We see that when in the Open *Aire*, the *Wire String* is sweeter, than the *String* of *Guts*. And we see that for *Reflexion*, *Water* excelleth; As in *Musick* neare the *Water*; Or in *Echo's*.

It hath bene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more *Silence*, than if the *Pipe* were dry: But yet with a sweet Degree of *Sedation*, or *Parting*. As we touched it before in the title of *Equality*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betwene dry and wet, become a little more Even and Smooth; But the Purling, which must needs proceed of *Inequality*, I take to be bred betwene the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the *Wood* of the *Pipe*, into which the Wet commeth not, as it remaineth dry.

In *Frosty* weather, *Musick* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Cuspe, and so more porous and hollow: And we see that *Old Lutes* sound better than a *New*, for the same reason. And so doe *Lute Strings* that haue bene kept long.

Sound is likewise *Meliorated* by the *Mingling* of open *Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Pioll* with a double Belly; Making another Belly with a Knot ouer the *Strings*; yet so, as there be Roome enough for the *String*, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; Whereas it useth to haue it but on one Side. The doubt may be, lest it should make too much *Re-sounding*; wherby one Note would ouertake another.

If you sing into the Hole of a *Drum*, it maketh the *Singing* more sweet.

Experiments
in Confort
touching the
Variation of
Sounds.

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sweet. And so I conceiue it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsonnesse and strangeness sake, it would not be amisse to haue a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

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When a *Sound* is created in a *Wind Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a *Trumper*, or *Pipe of Wood*; And againe in a *Trumper* or *Pipe of Brasse*. It were good to try *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

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Sounds are *meliorated* by the *Intension* of the *Sense*; where the *Common Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blinde Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is *fully Waking*.

Experiments
in Cōfort tou-
ching the Imit-
ation of Sounds.

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It is a Thing strange in Nature, when it is attentiuely considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which we shall say may seeme exceeding strange) that there is some *Transmission* of *Spirits*; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) we shall speake in due place; Chiefly when we come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a predisposition to *Imitate*. We see how ready Apes and Monkes are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

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In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, giuen them for the *Imitation*; And besides, you shall haue Parrots, that will not only *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore vpon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

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No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape
it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I haue knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparifon of *Beasts*, to *imitate* the Speech of *Man*, may be further enquired. We see that *Beasts* haue those Parts, which they count the *Instruments* of Speech, (as *Lips*, *Teeth*, &c.) liker vnto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* haue it, for the Length, as much as *Birds*. What better *Gorge*, or *Artire*, *Birds* haue, may be further enquired. The *Birds* that are knowne to be *Speakers*, are, *Parrots*, *Pyes*, *Jayes*, *Dawes*, and *Rauens*. Of which *Parrots* haue an adunke Bill, but the rest not.

But I conceiue, that the Aptnesse of *Birds*, is not so much in the *Conformation* of the *Organs* of Speech, as in their *Attention*. For Speech must come by *Hearing*, and *Learning*; And *Birds* giue more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keepe them *Waking*, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are euer the better *Singers*; which may be, because they are more liuely, and listen more.

Labour, and *Intention* to *imitate* voices, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselues; And so the *Voices* of other *Men* that they heare.

There haue bene some, that could counterfeit the *Disiunct* of *Voices*, (which is a *Secondary Object* of *Hearing*;) in such sort; As when they stand fast by you, you would thinke the *Speech* came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great vse of it, but for *Imposture*, in counterfeiting *Ghosts* or *Spirits*.

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion* *Concurrent*; A *Reflexion* *Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, wherof the first hath bene handled in the Title of *Magnitude* of *Sounds*: The Latter two we will now speake of.

The *Reflexion* of *Species Visible*, by *Mirroures*, you may command; Because passing in *Right Lines*, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in *Arched Lines*, cannot be so guided: And therefore we see there hath not bene practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome.

The *Naturall Eccho's* are made vpon *Walls*, *Woods*, *Rockes*, *Hills*, and *Dunckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; But being

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Experiments
in Consort,
touching the
Reflexion of
Sounds.

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being further off; (as vpon a large *Riuer*) they make an *Iterant Echo*: For there is no difference betweene the *Concurrent Echo*, and the *Iterant*, but the *Quicknesse*, or *Slownesse* of the *Returne*. But there is no doubt, but *Water* doth helpe the *Delation of Echo*; as well as it helpeth the *Delation of Originall Sonnds*.

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It is certaine, (as hath beene formerly touched,) that if you speake thorow a *Truncke*, stopped at the further end, you shall finde a *Blast* returne vpon your Mouth, but no *Sound* at all. The *Cause* is, for that the *Closenesse*, which preferueth the *Originall*, is not able to preserue the *Reflected Sound*: Besides that *Echo's* are seldom created, but by loud *Sounds*. And therfore there is lesse hope of *Artificiall Echo's* in *Aire*, pent in a narrow *Concaue*. Neuerthelesse it hath beene tried, that One leaning ouer a *Well*, of 25. Fathome deepe, and speaking, though but softly, (yet not so soft as a whisper,) the *Water* returned a good *Audible Echo*. It would be tried, whether Speaking in *Caves*, where there is no Issue, saue where you speake, will not yeeld *Echo's*, as *Wells* doe.

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The *Echo* commeth as the *Originall Sound* doth, in a Round Orbe of *Aire*: It were good to try the Creating of the *Echo*, where the Body *Repercussing* maketh an Angle: As against the *Returne* of a *Wall*, &c. Also we see that in *Mirrors*, there is the like Angle of Incidence, from the *Object* to the *Glasse*, and from the *Glasse* to the *Eye*. And if you strike a *Ball* side-long, not full vpon the *Surface*, the *Rebound* will be as much the contrary way; Whether there be any such *Resilience* in *Echo's*, (that is, whether a Man shall heare better, if he stand aside the Body *Repercussing*, than if he stand where he speaketh, or any where in a right Line betweene;) may be tried. Triall likewise would be made, by Standing nearer the Place of *Repercussing*, than he that speaketh; And againe by Standing further off, than hee that speaketh; And so Knowledge would be taken, whether *Echo's*, as well as *Originall Sounds*, be not strongest neare hand.

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There be many Places, where you shall heare a Number of *Echo's*, one after another: And it is, when there is Variety of *Hills*, or *Woods*, some nearer, some further off: So that the *Returne* from the further, being last created, will be likewise last heard.

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As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that speaketh; So likewise doth the *Echo*; For you haue many Back-*Echo's* to the Place where you stand.

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To make an *Echo*, that will report, three, or foure, or fise Words, distinctly, it is requisite, that the Body *Repercussing*, be a good distance off: For if it be neare, and yet not so neare, as to make a *Concurrent Echo*, it choppeth with you vpon the sudden. It is requisite likewise, that the *Aire* be not much pent. For *Aire*, at a great distance, pents, worketh the same effect with *Aire*, at large, in a small distance. And therefore in the Triall of Speaking in the *Well*, though the *Well* was deepe, the *Voice* came backe, suddenly; And would beare the Report but of two Words.

For

For *Eccho's* vpon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-charenton* ; And some Bird-bolt shot, or more, from the Riuer of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing ; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against euery Pillar, a Stacke of Billers, aboue a Mans Height ; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene seuerall times ; And I haue heard of others, that it would returne sixteene times : For I was there about three of the Clocke in the After-noonne : And it is best, (as all other *Eccho's* are) in the Euening. It is manifest, that it is not *Eccho's* from seuerall places, but a *Tossing* of the Voice, as a Ball, to and fro ; Like to *Reflexions* in *Looking-glasses* ; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before ; And againe, the *Glasse* before in that ; and diuers such *Super-Reflexions*, till the *species speciei* at last die. For it is euery Returne weaker, and more shady. In like manner, the Voice in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions* ; For it melteth by degrees, and euery *Reflexion* is weaker than the former : So that, if you speake three Words, it will (perhaps) some three times report you the whole three Words ; And then the two latter Words for some times ; And then the last Word alone for some times ; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or fise Words ; In this *Eccho* of so many Returnes, vpon the matter, you heare aboue twenty Words, for three.

The like *Eccho* vpon *Eccho*, but only with two Reports, hath beene obserued to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will giue a *Backe-Eccho* ; One taking it from the other, and the latter the weaker.

There are certaine *Letters*, that an *Eccho* will hardly expresse ; As *S*, for one ; Especially being Principiall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (said he) call *Saran*, and the *Eccho* will not deliuer backe the *Deuils* name ; But will say, *Vae' en* ; Which is as much in *French*, as *Apage*, or *Anoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*.

Eccho's are some more sudden, and chop againe, as soone as the Voice is deliuered ; As hath beene partly said : Others are more deliberate, that is, giue more Space betweene the Voice, and the *Eccho* ; which is caused by the locall Nearenesse, or Distance : Some will report a longer Train of Words ; And some a shorter : Some more loud (full as loud as the Original,

ginal, and sometimes more loud;) And some weaker and fainter.

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Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a *Quiet of Eccho's*, and so make the Report greater, and euen a *Continued Eccho*; which you shall finde in some *Hills*, that stand encompassed, Theater-like.

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It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through diuers *Mediums*, (as *Aire, Cloth, Wooe*) it would deliver the *Sound*, in a differing Place, from that vnto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration*, which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diuersitie of *Mediums*.

Experiments
in Cōsort tou-
ching the con-
sistent and Dissi-
militie between *Visi-
bles & Audibles*.

We haue *obiter*, for Demonstrations sake, vsed in diuers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But wee thinke good now to prosecute that *Comparison* more fully.

CONSISTENT OF VISIBLES, and Audibles.

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Both of them spread themselves in Round, and fill a whole Floare or Orbe, vnto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Objects from the Sensories.

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Both of them haue the whole *Species* in every small Portion of the *Aire*, or *Medium*; So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Leuels*, as to the *Eye*; And in *Cran- nies*, or *Chinks*, as to the *Sound*.

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Both of them are of a sudden and easie Generation and Delation; And likewise perish swiftly, and suddenly; As if you remoue the *Light*; Or touch the *Bodies* that giue the *Sound*.

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Both of them doe receiue and carry exquisite and accurate Differences; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quauerings, in *Audibles*.

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Both of them in their Vertue and Working, doe not appeare to emit any Corporall Substance into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stirre any euident locall Motion in their *Mediums*, as they passe; But only to carry certaine Spirituall Species; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, wee shall search and handle in due place.

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Both of them seeme not to generate or produce any other Effect in Nature.

cure, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest Effects. The First, in that the *Stranger Species* drowneth the *Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reuerberate*; As in *Mirrors*; And in *Echo's*.

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Neither of them doth *destroy or hinder the Species of the other*, although they encounter in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *è contrà*.

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Both of them affect the *Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet neuertheless, the *Objects* of them doe also (if it be well obserued) affect and worke vpon dead Things; Namely, such as haue some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke vpon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* vpon the Places of *Echo*, which resemble, in some sort, the Cauerne and structure of the Eare.

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Both of them doe diuersly worke, as they haue their *Medium* diuersly disposed. So a Trembling *Medium* (as Smoake) maketh the *Object* seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall.

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To *Both*, the *Medium*, which is the most Propitious and Conducibile, is *Aire*; For *Glasse* or *Water*, &c. are not comparable.

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In *Both* of them, where the *Object* is *Fine and Accurate*, it conduceth much to haue the *Sense Intensive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentiuely; which in *Beasts* that haue *Eares moueable*, is most manifest.

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The *Beames of Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action *materiate*, differing from the Action of *Sound*; If it be true (which is anciently reported) that *Birds*, with great *thouts*, haue fallen downe.

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DISSENTS OF VISIBLES, and Audibles.

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THe *Species* of *Visibles* seeme to be *Emissions* of *Beames* from the *Object* scene; Almost like *Odours*; saue that they are more *Incorporeall*: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions* or *Impressions* made vpon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

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The *Species* of *Audibles* seeme to be carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceiue) that a *Contrary* strong *Wind* will not much hinder the *Sight* of *Visibles*, as it will doe the *Hearing* of *Sounds*.

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There is one *Difference*, aboue all others, betweene *Visibles* and *Audibles*, that is the most remarkable; As that wherupon many smaller *Differences* doe depend: Namely, that *Visibles*, (except *Lights*,) are carried in *Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the *Solidity* of Bodies doth not much hinder the *Sight*, so that the Bodies be cleare, and the Pores in a *Right Line*, 'as in *Glasse*, *CrySTALL*, *Diamonds*, *Water*, &c. But a thin *Scarfe*, or *Handkerchiefe*, though they be Bodies nothing so solide, hinder the *Sight*: Whereas (contrariwise) these *Porous Bodies* doe not much hinder the *Hearing*, but solide Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small *Glasses* suffice; but to the *Reuerberation* of *Audibles*, are required greater *Spaces*, as hath likewise beene said before.

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Visibles are scene further off, than *Sounds* are heard; Allowing neuerthelesse the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* scene.

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Visibles require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better scene; Whereas in *Audibles*, the nearer the *Approch* of the *Sound* is to the *Sense*, the better. But in this there may be a double *Errour*. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the *Pupill* of the *Eye* (all ouer,) excludeth the *Light*. For I haue heard of a *Person* very credible, (who himselfe was cured of a *Cataract* in one of his *Eyes*,) that while the *Siluer Needle* did worke vpon the *Sight* of his *Eye*, to remoue the *Filme* of the *Cataract*.

not, he neuer saw any thing mote cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was less than the *Pupill* of the Eye, and so tooke not the Light from it. The other Reason may be, for that the *Object* of *Sight* doth strike vpon the *Pupill* of the Eye, directly without any interception; whereas the *Cane* of the *Eare* doth hold off the *Sound* a little from the Organ: And so neuertheless there is some *Distance* required in both.

Visibles are swifter carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which haue beene set downe heretofore, but are proper for this *Title*.

It seemeth also, that the *Spirits* of *Audibles* doo hang longer in the Aire, than those of *Visibles*: For although even those of *Visibles*, doe hang some time, as we see in *Flares* turned, that shew like Spheres; In *Lute Strings* stillped, A *Pire-brand* caried along, which leaueth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceiue that *Sounds* stay longer, because they are carried vp and downe with the Winde: And because of the Distance of the Time, in *Ordinance discharged*, and heard twenty Miles off.

In *Visibles*, there are not found *Objects* so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate *Objects*. And therefore in *Pictures*, those foule *Sights* doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpened, doth offend so much, as it letteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-waies refuse.

In *Visibles*, after great Light, if you come suddenly into the *Darkes*; Or contrariwise, out of the *Darkes* into a *Glaring light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after a deepe *Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are stricken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell vpon Bridges.

It seemeth that the *Impression of Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; wherof the Basis is in the *Object*, and the Verticall Point in the Eye; So as there is a Corradiation and Confusion of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, wherof we speake not. For the *Beames* passe, and giue little Tincture to that Aire, which is Adiacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*, so otherwise it is in the *Body of Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper wheron One writeth; So that the *Light* is seene, where the *Body* of the *Flame* is not seene; And where any *Colour* (if it were placed where the *Body* of the *Flame* is) would not be seene. I iudge that *Sound* is of this Latter Nature:

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ture : For when two are placed on both sides of a Wall, and the Voice is heard, I iudge it is not onely the *Originall Sound*, which passeth in an *Arched Line* ; But the *Sound*, which passeth about the Wall in a *Right Line*, begetteth the like Motion round about it, as the first did, though more weake.

Experiments
in Confort,
touching the
Sympathy or
Antipathy of
Sounds, one
with another.

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All *Concords* and *Discords* of *Musicke*, are, (no doubt,) *Sympathies*, and *Antipathies* of *Sounds*. And so (likewise) in that *Musicke*, which we call *Broken Musicke*, or *Consort Musicke* ; Some *Consorts* of *Instruments* are sweeter than others ; (A Thing not sufficiently yet observed :) As the *Irish Harpe*, and *Base Viall* agree well : The *Recorder* and *Stringed Musick* agree well : *Organs* and the *Voice* agree well ; &c. But the *Virginalls* and the *Lute* ; Or the *Welsh-Harpe*, and *Irish-Harpe* ; Or the *Voice* and *Pipes* alone, agree not so well ; But for the *Melioration* of *Musicke*, there is yet much left (in this Point of *Exquisite Consorts*) to try and enquire.

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There is a Common Obseruation, that if a *Lute*, or *Viall*, be layed vpon the Backe, with a small Straw vpon one of the *Strings* ; And another *Lute* or *Viall* be laid by it ; And in the other *Lute* or *Viall*, the *Vnison* to that *String* be stricken ; it will make the *String* moue ; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapason* or *Eight* to that *String* be stricken, either in the same *Lute*, or *Viall*, or in others lying by ; But in none of these there is any Report of *Sound*, that can be discerned, but onely Motion.

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It was deuised, that a *Viall* should haue a Lay of Wire Strings below, as close to the Belly, as a *Lute*, And then the *Strings* of Guts mounted vpon a Bridge, as in Ordinary *Vialls* ; To the end, that by this means, the vpper *Strings* stricken, should make the lower resound by *Sympathy*, and so make the *Musicke* the better ; Which, if it be to purpose, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this deuice I conceiue to be of no vse ; because the vpper *Strings*, which are stopped in great variety, cannot maintaine a *Diapason* or *Vnison*, with the Lower, which are neuer stopped. But if it should be of vse at all ; it must be in *Instruments* which haue no Stops ; as *Virginalls*, and *Harpes* ; wherein triall may be made of two Rowes of Strings, distant the one from the other.

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The Experiment of *Sympathy* may be transferred (perhaps) from *Instruments* of *Strings*, to other *Instruments* of *Sound*. As to try if there were in one Steeple, two Bells of *Vnison*, whether the striking of the one would moue the other, more than if it were another Accord : And so in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would moue in the one *Pipe*, when the other is blowne at an *Vnison*.

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It seemeth, both in *Eare*, and *Eye*, the *Instrument* of *Sense* hath a *Sympathy* or Similitude with that which giueth the *Reflexion* ; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a *CrySTALL*, or *Glas*se, or *Water* ; So is the *Eare* a sinuous *Cane*, with a hard Bone, to
stop

thing and reuerberate the *Sound*: Which is like to the Places that report *Eccho's*.

When a Man *yawneth*, he cannot *Heare* so well. The *Cause* is, for that the *Membrane* of the *Eare* is extended; And so rather casteth off the *Sound*, than draweth it to.

We *Heare* better when we *hold our Breath*, than contrary; In so much as in all Listening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cause* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driueth away the voice, than draweth it: And besides we see, that in all *Labour* to doe things with any strength, we *hold the Breath*: And listening after any *Sound*, that is heard with difficulty, is a kinde of *Labour*.

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to succeed,) to make an *Instrument* like a *Tunnell*; The narrow Part whereof may be of the Bignesse of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be set close to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard distinctly, from further distance, than without that *Instrument*; being (as it were) an *Eare-Spectacle*. And I haue heard there is in *Spaine*, an *Instrument* in vse to be set to the *Eare*, that *helpeth* somewhat those that are Thicke of *Hearing*.

If the *Mouth* be shut close, neuerthelesse there is yeelded by the Roofe of the Mouth, a Murmur. Such as is vsed by dumbe Men: But if the *Nostrills* be likewise stopped, no such Murmur can be made; Except it be in the Bottome of the *Pallate* towards the Throat. Whereby it appeareth manifestly, that a *Sound* in the *Mouth*, except such as aforesaid, if the *Mouth* be stopped, passeth from the *Pallate*, thorow the *Nostrills*.

The *Repercussion* of *Sounds*, (which we call *Eccho*.) is a great Argument of the *Spirituall Essence* of *Sounds*. For if it were *Corporeall*, the *Repercussion* should be created in the same maner, and by like *Instruments*, with the *Originall Sound*: But we see what a Number of *Exquisite Instruments* must concur in Speaking of Words, whereof there is no such Matter in the Returning of them; But onely a plaine Stop, and *Repercussion*.

The *Exquisite Differences* of *Articulate Sounds*, carried along in the *Aire*, shew that they cannot be *Signatures* or *Impressions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent *Impressions*: And so it may be thought of *Sounds* in their first Generation: But then the *Delation* and *Continuance* of them without any new Sealing, shew apparently they cannot be *Impressions*.

All *Sounds* are suddenly made, and doe suddenly perish; But neither that, nor the *Exquisite Differences* of them, is Matter of so great Admiration: For the Quauering, and Warblings in Lutes, and Pipes,

Experiments
in Consort,
touching the
Hearing or
Helping of the
Hearing.

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Experiments
in Consort
touching the
Spirituall and
Fine Nature of
Sounds.

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are

are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserueth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And these shall be Entire in euery little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

The *Sudden Generation and Perishing of Sounds*, must be one of these two Waies. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being diuided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiuing the *Sound* at the first: But then other Groffe and more Materiate Qualities of the Aire straightwaies suffocate it; Like vnto *Flame*, which is generated with Alacrity, but straight quenched by the Enmity of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are diuided; 1. *Musicall, Immusicall*; 2. *Treble, Base*; 3. *Flat, Sharpe*; 4. *Soft, Loud*; 5. *Exteriour, Interiour*; 6. *Cleane, Harsh* or *Purling*; 7. *Articulate, Inarticulate*.

We haue laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both because *Sound* is one of the most hidden Portions of *Nature*, (as we said in the beginning;) And because it is a *Virtue* which may be called *Incorporeall*, and *Immateriate*; wherof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a *Patterne* or *President* of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subiects which require it. For we desire that Men should learne and perceiue, how seuer a Thing the true *Inquisition* of *Nature* is; And should accustomethemselues, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; And not reduce the World to the Narrownesse of their Mindes.

Metalls giue Orient and Fine Colours in Dissolutions; As Gold giueth

an

an excellent Yellow; *Quick-Silver* an excellent Greene; *Time* giueth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Vindgrease*, *Bife*, *Cirrus*, &c. And likewise in their *Vitrifications*. The Cause is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equal! Posture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefly, to make *Colours* lightsome.

ching the Orient Colours, in dissolution of Metalls.

291

It conduceth vnto *Long Life*, and to the more Placide Motion of the Spirits, which thereby doe lesse prey and consume the Iuyce of the Body; Either that *Mens Actions* bee free and voluntary; That nothing bee done *Inuiti* *Minerui*, but *Secundum Genium*: Or on the other side, that the *Actions* of Men bee full of Regulation, and Commands within themselves: For then the Victory and Performing of the Command, giueth a good Disposition to the Spirits; Especially if there bee a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as doe continually enioyne themselves.

Experiment Solitary touching Prolongation of Life.

292

It is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Euitation of Solution of Continuity: And of this *Appetite* there bee many Degrees; But the most Remarkable, and fit to bee distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleauing* or *Tenacious*. In *Liquours*, this *Appetite* is weake: Wee see in *Liquours*, the Thredding of them in *Stillicides*, (as hath beene said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles* and *Froth*. In the second Degree or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Bird-lime*, &c. But note, that all *Solide Bodies* are *Cleauing*, more or lesse: And that they loue better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantity, cleaueth to any Thing that is Solide; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaueth: But those *Bodies* which are noted to bee Clammy, and *Cleauing*, are such, as haue a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to Themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forraine

Experiment Solitary touching Appetite of Vnion in Bodies.

293

Body, than in preserving their owne *Consistence*; And which haue little predominance in *Drought*, or *Moisture*.

Experiment
Solitary touching the like
Operations of
Heat, and Time.

294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe easily expire; As Parchment, Leaues, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolueth and melteth Bodies, that keepe in their Spirits; As in diuers *Liquefactions*; And so doth *Time*, in some Bodies of a softer *Consistence*: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is euer more cleare, and more hot in Medicinable vse. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatility* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment
Solitary touching the differing
Operations of Fire, and
Time.

295

Some Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards giue againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolue.

Experiment
Solitary touching Motions
by Imitation.

296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Inuitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heauy, by any Vapour, or the like. For then they strue, (as it were,) to wring out, and expell that which loadeth them. So Men drowzy, and desirous to sleepe; Or before the Fit of an Ague; doe vse to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interiection* of *Expulsion*: So that if another be apt and prepared to doe the like, he followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment
Solitary touching Infectious
Diseases.

297

There be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pesilences*, *Lippiundes*, and such like. Secondly, such as Taint the *Breath*; Which wee see passeth manifestly from Man to Man; And not inuisibly, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the Body *Adiacent*.

Adjacent; Especially if they consist in an Viscuous Substance, not apt to dissipate; Such are *Scabs*, and *Lecrouse*. Fourthly, such as are merely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they neuer infect, but by *Touch* onely; And such a *Touch* also, as commeth within the *Epidermis*; As the Venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* be the thicker Body; As *Metals*; &c. The Reason is the Congruity of Bodies; which if it be more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *Water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for Others. If the Body be Hot, and Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much ypon *Exercise*. Likewise Men ought to beware, that they vse not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentiful Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excrete by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it be much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *Women* live longer than *Men*, because they stirre lesse.

Some *Food* we may vse long, and much, without *Glutting*; As Bread, Flesh that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The Cause is, for that *Appetite* consisteth in the Emptiness of the Mouth of the Stomack; Or possessing it with somewhat that is Astringent; And therefore Cold and Dry. But things that are Sweet and Fat, are more Filling: And do swimme and hang more about the Mouth of the Stomack; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and euer abateth the Appetite. Wee see also, that another Cause of *Satiety*, is an *Over-custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To giue the Reason of the *Disfast* of *Satiety*, and of the Pleasure

Experiment
Solitary touching the Incorporation of Powders and Liquors.

298

Experiment
Solitary, touching Exercise of the Body.

299

Experiment
Solitary, touching Meats, that induce Satiety.

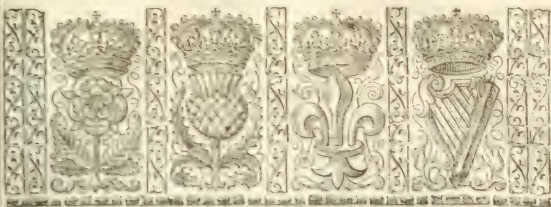
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sure in *Novelty*; and to distinguish not onely in Meats and Drinkes, but also in Motions, Lones, Company, Delights, Studies, what they be that *Custom* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cause is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Relish by former vse. And (generally) it is a Rule, that whatsoeuer is somewhat Ingrate at first, is made Gratefull by *Custom*; But whatsoeuer is too Pleasing at first, groweth quickly to *sate*.

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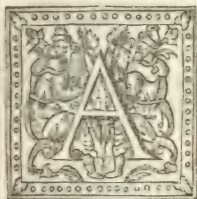
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NATVRALL HISTORIE.

IV. Century.



ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Nature*. And euen in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. We will now therefore proceed to the Enquiry of it : And for *Acceleration* of *Germination*, we will referre it ouer, vn-

to the place, where we shall handle the Subiect of *Plants*, generally ; And will now begin with other *Accelerations*.

Liquours are (many of them,) at the first, thicke and troubled ; As *Must*, *Wort*, *Juyces* of *Fruits*, or *Hearbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke ; For it is a Spurre to *Nature*, and putteth her out of her pace : And besides, it is of good vse, for making *Drinkes*, and *Sauces*, Potable, and Seruiceable, speedily ; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Separation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spiritus* of the *Liquour*, with the *Tangible Parts* : For that euer representeth Bodies Cleare and Vntrou-

Experiments
in Confort
touching the
Clarification of
Liquours, and
the *Accelerating*
thereof.

bled. The third, by the *Refining* the *Spirit* it *selfe*, which therby giueth to the *Liquour* more Splendour, and more Lustre.

302 First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the feuerall Parts, either vp, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which *Viscous* Body (afterwards feuered) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Euen Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*; (For of *Time* we speake not, because it is that, we would anticipate & represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue* to *attenuate*. So therefore (hauing shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practise, to draw *Wine*, or *Beere*, from the *Lees*, (which we call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast vp some Spissitude: And this *Instance* is to be referred to *Separation*.

306 On the other side, it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the vnacked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The Reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottoome. And therefore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck : Let the Bottle be well stopped, lest it flie out : And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched*, and *Unquenched*, and set the Bottles in them, *ut supra*. This *Instance* is referred, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Whee-Barrow*, vpon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leaue some *Aire*; For if the *Liquour* come close to the *Stopple*, it cannot play, nor flower: And when you haue shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the vsuall manner; For if it stay with much *Aire* in it, the *Drinke* will pall; neither will it settle so perfectly in all the *Parts*. Let it stand some 24. houres: Then take it, and put it againe into a *Bottle* with *Aire*, *ut supra*: And thence into a *Bottle Stopped*, *ut supra*: And so repeat the same *Operation* for seuen dayes. Note that in the *Emptying* of one *Bottle* into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little *Aire* below the *Neck*, without *Emptying*. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*;) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New Beere*, and stirred with it: For it may be that the *Grosser Part* of the *Beere* will cleaue to the *Milke*: The Doubt is, whether the *Milke* will seuer well againe; Which is soone tried. And it is vsuall in *Clarifying Ippocrasse* to put in *Milke*; Which after seuereth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they run *New Beere*, they vse to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three *Natures*. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Ficers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof we will speake as *Occasion* serueth. But we will begin with that of *Drinkes*, because it hath such *Affinitie* with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the *Grosser Parts*: And it is effected partly, by the same meanes, that *Clarification* is, (whereof wee spake before;) But then note, that an *Extreme Clarification* doth

M

spread

310

311

Experiments
in Confort
touching *Ma-
turation*, and
the *Accelerating*
thereof. And
first touching
the *Maturation*
and *Quickning*
of *Drinks*. And
next touching
the *Maturation*
of *Fruits*.

312

spread the *Spirits* so Smooth, as they become Dull, and the *Drinke* dead, which ought to haue a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313

We see the *Degrees of Maturation of Drinckes* ; In *Must* ; In *Wine*, as it is drunke ; And in *Vinegar*. Whereof *Must* hath not the *Spirits* well Congregated ; *Wine* hath them well vnited ; so as they make the Parts somewhat more Oylie : *Vinegar* hath them Congregated, but more Ieiune, and in smaller Quantitie ; The greatest and finest Spirit and Part being exhalled : For we see *Vinegar* is made by setting the Vessell of *Wine* against the hot Sun : And therefore *Vinegar* will not burne ; For that much of the Finer Parts is Exhaled.

314

The *Refreshing and Quickning of Drinke* Paired, or Dead, is by *Enforcing the Motion of the Spirit* : So wee see that *Open Weather* relaxeth the *Spirit*, and maketh it more liuely in *Motion*. Wee see also *Bottelling of Beere*, or *Ale*, while it is New, and full of *Spirit*, (so that it spirith when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan of Coales* in the *Cellar* doth likewise good, and maketh the *Drinke* worke againe. New *Drinke*, put to *Drinke* that is Dead, prouoketh it to worke againe : Nay, which is more, (as some affirme,) A *Brewing of New Beere*, set by *Old Beere*, maketh it worke againe. It were good also to *Enforce the Spirits* by some *Mixtures*, that may excite and quicken them ; As by Putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We see *Creame* is *Matured*, and made to rise more speedily, by Putting in *Cold Water* ; which, as it seemeth, getteth downe the *Whey*.

315

It is tried, that the *Burying of Bottles of Drinke* well stopped, either in drie *Earth*, a good depth ; Or in the *Bottom of a Well within Water* ; And best of all the *Hanging of them in a deepe Well somewhat above the Water*, for some fortnights space, is an Excellent *Meanes* of making *Drinke* fresh, and quicke : for the *Cold* doth not cause any Exhaling of the *Spirits* at all ; As *Heat* doth, though it rarifieth the rest that remaine : But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they Incorporate the Parts of the *Liquour* perfectly.

316

As for the *Maturation of Fruits* ; It is wrought by the *Calling forth of the Spirits of the Body outward*, and so *Spreading* them more smoothly : And likewise by *Digesting*, in some degree, the *Grosser Parts* : And this is Effected, by *Heat* ; *Motion* ; *Attraction* ; And by a *Rudiment of Putrefaction* : For the *Inception of Putrefaction* hath in it a *Maturation*.

317

There were taken *Apples*, and laid in *Straw* ; In *Hay* ; In *Flower* ; In *Chalke* ; In *Lime* ; Couered ouer with *Onions* ; Couered ouer with *Crabs* ; Closed vp in *Wax* ; Shut in a *Box* ; &c. There was also an *Apple* hangd vp in *Smoake* : Of all which the *Experiments* sorted in this Manner.

318

After a *Moneths Space*, the *Apple* Enclosed in *Wax*, was as Greene and Fresh as at the first Putting in, and the *Kernells* continued White. The Cause is, for that all *Exclusion of Open Aire*, (which is euer Predatory) maintaineth the Body in his first Freshnesse, and Moisture : But the Inconuenience

conuenience is, that it tasteth a litle of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

The *Apple* Hanged in the *Smoke*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a *Roast Apple* Softeneth and Melterh; And *Pigs-feet*, made of *Quarters of Wardens*, scorch and haue a Skin of Cole) doth Mellow, and not Adure: The *Smoke* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Pears*, and *Prunes*, in the *Ouen*, and Remouing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

The *Apples* couered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their Yellownesse, and Sweetnesse. The *Cause* is, for that that Degree of *Heat* which is in *Lime*, and *Ashes*, (being a Smoothing *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Use.

The *Apples*, Couered with *Crabs*, and *Onions*, were likewise well *Matured*. The *Cause* is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So wee see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first vpon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botram citius maturescit*.

The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* haue a very low degree of *Heat*, but yet Close and Smoothing, and which drieth not.

The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *Warmth*: As we see in *Wool*, *Fur*, *Plush*, &c.

Note that all these were Compared with another *Apple*, of the same kinde, that lay of it Selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.

Take an *Apple*, or *Peare*, or other like *Fruit*, and Rowle it vpon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Unequall Distribution* of the *Spirits* maketh the *Harshnesse*: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should Rowle them but gently, perhaps twice a day; And continue it some seuen dayes, it is like they would *mature* more finely, and like vnto the *Naturall Maturation*.

Take an *Apple*, and cut out a Peece of the Top, and couer it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see that

that where a *Wasse*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326

Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, euery day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these *Trialls* also, as was used in the first, see another of the same *Fruits* by, to Compare them: And trie them, by their *Yellownesse*, and by their *Sweetnesse*.

Experiment
Solitary, touch-
ing the Ma-
king of Gold.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I iudge to be possible; But the *Means* (hitherto propounded) to effect it, are, in the *Practise*, full of *Errour* and *Imposture*; And in the *Theory*, full of vnfound *Imaginations*. For to say, that *Nature* hath an *Intention* to make all *Metals Gold*; And that, if she were deliuered from *Impediments*, she would performe her owne *Worke*; And that, if the *Crudities*, *Impurities*, and *Leprosities* of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the *Worke* of *Proiection*, will turne a *Sea* of the *Baser Metall* into *Gold*, by *Multipling*: All these are but *dreames*: And so are many other *Grounds* of *Alchymy*. And to helpe the *Matter*, the *Alchymists* call in likewise many *Vanities*, out of *Astrologie*; *Naturall Magicke*; *Superstitious Interpretations* of *Scriptures*; *Auricular Traditions*; *Faigned Testimonies* of *Ancient Authors*; And the like. It is true, on the other side, they haue brought to light not a few profitable *Experiments*, and thereby made the World some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true *Wayes* and *Passages* of *Nature*, which may leade to this great *Effect*. And wee commend the wit of the *Chineses*, who despaire of *Making of Gold*, but are Mad vpon the *Making of Siluer*: For certaine it is, that it is more difficult to make *Gold*, (which is the most *Ponderous* and *Materiate* amongst *Metalls*) of other *Metalls*, lesse *Ponderous*, and lesse *Materiate*; than (*via versa*) to make *Siluer* of *Lead*, or *Quick-Siluer*; Both which are more *Ponderous* than *Siluer*; So that they
need

need rather a further Degree of *Fixation*, than any *Condensation*. In the meane time, by Occasion of Handling the *Axiomes* touching *Maturation*, we will direct a *Triall* touching the *Maturing* of *Metalls*, and therby Turning some of them into *Gold*: For we conceiue indeed, that a perfect good *Concoction*, or *Digestion*, or *Maturation* of some *Metalls*, will produce *Gold*. And here we call to minde, that wee knew a *Dutch-man*, that had wrought himselfe into the beleefe of a great Person, by vndertaking that he could make *Gold*: Whose discourse was, that *Gold* might be made; But that the *Alchymists* Ouer-fired the Worke: For (he said) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lampe, that should carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Deuice of the Lampe was folly; But the Ouer-firing now vsed; And the Equall Heat to be required; And the Making it a Worke of some good Time; are no ill Discourses.

We resort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The First is, that there be *used* a *Temperate Heat*; For they are euer *Temperate Heats* that *Digest*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subiect*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all vpon *Metalls*. The Second is, that the *Spirit* of the *Metall* be *quickened*, and the *Tangible Parts* opened: For without those two Operations, the *Spirit* of the *Metall*, wrought vpon, will not be able to digest the Parts. The Third is, that the *Spirits* doe *spread themselves* *Euen*, and *move not Subsultorily*; For that will make the Parts Close, and Pliant. And this requireth a Heat, that doth not rise and fall, but continue as *Equall* as may be. The Fourth is, that no Part of the *Spirit* be emitted, but detained: For if there be *Emission* of *Spirit*, the Body of the *Metall* will be Hard, and Churlish. And this will be performed, partly by the Temper of the Fire; And partly by the closeness of the Vessell. The Fifth

Fifth is, that there be *Choice made of the likeliest and best Prepared Metall, for the Version*: For that will facilitate the Worke. The Sixth is, that you giue *Time enough for the Worke*: Not to prolong Hopes (as the Alchymists doe;) but indeed to giue *Nature* a conuenient Space to worke in. These Principles are most certaine, and true; Wee will now deriue a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

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Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be such, as may keepe the *Metall perpetually Moulten*, and no more; For that aboue all importeth to the Worke. For the *Materiall*, take *Siluer*, which is the *Metall* that in *Nature* Symbolizeth most with *Gold*; Put in also, with the *Siluer*, a Tenth Part of *Quick-siluer*, and a Twelfth Part of *Nitre*, by weight; Both these to quicken and open the Body of the *Metall*: And so let the Worke be continued by the *Space of Six Moneths*, at the least. I wish also, that there be, at some times, an Iniection of some *Oyled Substance*; Such as they vse in the Recouering of *Gold*, which by Vexing with Separations hath beene made Churlish: And this is, to lay the Parts more Close and Smooth, which is the Maine Worke. For *Gold* (as we see) is the Closest (and therefore the Heauiest) of *Metalls*: And is likewise the most Flexible, and Tensible. Note, that to thinke to make *Gold* of *Quick-siluer*, because it is the heauiest, is a Thing not to be hoped; For *Quick-siluer* will not endure the Mannage of the *Fire*. Next to *Siluer*, I thinke *Copper* were fittest to bee the *Materiall*.

Experiment
Solitary touch-
ing the Na-
ture of Gold.

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Gold hath these *Natures*: *Greatnesse of Weight*; *Closenesse of Parts*; *Fixation*; *Pliantnesse*, or *Sofinesse*; *Immunity from Rust*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though most about,) to make *Gold*, is to know the *Causes* of the *Seuerall Natures* before rehearsed, and the *Axiomes* concerning the same. For if a Man can make a *Metall*, that hath all these *Properties*, Let Men dispute, whether it be *Gold*, or no?

Experiments
in Confort
touching the
Enducing and
Accelerating of
Putrefaction.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Vniuersall Enquiry: For *Corruption* is a Reciprocall to *Generation*: And they *Two*, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which euer are Vnquiet to Get forth, and Congregate with the *Aire*, and to enioy the *Sun-beames*. The *Getting forth*, or *Spreading* of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If
the

the *Spirits* be detained within the Body, and moue more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Digestion*, or *Maturation*, As in *Drunkes*, and *Fruits*. If the *Spirits* be not meereley Detained, but Protrude a litle, and that Motion be Confused, and Inordinate, there followeth *Putrefaction*; Which euer dissolueth the Consistence of the Body into much Inequality; As in *Flesh*, *Rotten Fruits*, *Shining Wood*, &c. And also in the *Rust* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Viuitication*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* issue out of the Body, there followeth *Desiccation*, *Induration*, *Consumption*, &c. As in *Bricke*, *Euaporation of Bodies Liquid*, &c.

The *Means* to *Enduce* and *Accelerate Putrefaction*, are; First by *Adding some Crude or Watry Moisture*; As in *Wetting* of any *Flesh*, *Fruit*, *Wood*, with *Water*, &c. For contrariwise *Vacuous* and *Oily Substances* preſerue.

The Second is by *Inuitation* or *Excitation*; As when a *Rotten Apple* lyeth close to another *Apple* that is *Sound*: Or when *Dung* (which is a Substance already *Putrified*) is added to other Bodies. And this is also notably ſcene in *Church-yards*, where they bury much; Where the Earth will consume the *Corps*, in farre shorter time, than other Earth will.

The Third is, by *Cloſeneſſe*, and *Stopping*, which detaineth the *Spirits*, in *Prison*, more than they would; And thereby irritateth them to ſeek Issue; As in *Corne*, and *Cloaths*, which waxe *Musty*; and therefore *Open Aire* (which they call *Aer perſtabilis*) doth preſerue: And this doth appeare more Euidently in *Agues*, which come (moſt of them,) of *Obſtructions*, and *Penning* the *Humours*, which thereupon *Putriſie*.

The Fourth is, by *Solation of Continuity*; As we ſee an *Apple* will rot ſooner, if it be *Cut* or *Pierced*; And ſo will *Wood*, &c. And ſo the *Fleſh* of *Creatures* aliue, where they haue received any *Wound*.

The Fifth is, either by the *Exhaling*, or by the *Drining back* of the *Principall Spirits*, which preſerue the Conſiſtence of the *Body*; So that when their *Gouernment* is *Dissolued*, euery *Part* returneth to his *Nature*, or *Homogeny*. And this appeareth in *Urine*, and *Blond*, when they coole, and thereby breake; It appeareth alſo in the *Gangrene*, or *Mortification* of *Fleſh*, either by *Opiates*, or by *Intenſe Colds*. I conceiue alſo the ſame Effe& is in *Pestilences*, ſor that the *Malignity* of the *Inſecting Vapour*, daunceth the *Principall Spirits*, and maketh them fly, and leaue their *Regiment*; And then the *Humours*, *Fleſh*, and *Secondary Spirits*, doe diſſolue, and breake, as in an *Anarchy*.

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The Sixth is, when a *Forraine Spirit*, Stronger and more Eager than the Spirit of the Body, entreats the Body; As in the Stinging of Serpents. And this is the Cause (generally) that vpon all *Poysons* followeth Swelling: And we see Swelling followeth also, when the Spirits of the Body it selfe, Congregate too much; As vpon Blowes, and Bruises; Or when they are Pent in too much, as in Swelling vpon Cold. And we see also, that the Spirits comming of Putrefaction of Humours in Agues, &c. Which may be counted as *Forraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and Heat.

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The Seuenth is, by such a *Weake Degree of Heat*, as setteth the Spirits in a little Motion, but is not able, either to digest the Parts, or to Issue the Spirits; As is seene in *Flesh* kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keepe longer. And wee see, that *Viuification* (whereof *Putrefaction* is the Bastard Brother,) is effected by such Soft Heats; As the Hatching of Eggs; The Heat of the Wombe, &c.

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The Eighth is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Couerture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron*, *Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the Crust, for the Spirits to come forth.

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The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and dry*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

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The Tenth is, by *Time*, and the *Worke and Procedure of the Spirits themselves*, which cannot keepe their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As wee see in Corne not stirred; And Mens Bodies not exercised.

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All Moulds are Inceptions of *Putrefaction*; As the Moulds of *Pyes*, and *Flesh*; the Moulds of *Orenge*s, and *Limon*s; which Moulds afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly) proue to be of ill O Jour. And if the Body be Liquid, and not apt to Putrifie totally, it will cast vp a Mother in the Top; As the Mothers of *Distilled Waters*.

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Mosse is a Kinde of Mould, of the Earth, and Trees. But it may be better sorted as a *Rudiment of Germination*; To which we referre it.

Experiments
in Conser-
uation, touch-
ing Pro-
hibiting and
Preventing Pu-
trefaction.

It is an Enquiry of Excellent vse, to Enquire of the *Meanes* of *Preuenting* or *Staying Putrefaction*; For therein consisteth the *Meanes* of *Conseruation* of Bodies; For Bodies haue two Kindes of *Dissolutions*; The one by *Consumption*, and *Desiccation*; The other by *Putrefaction*. But as for the *Putrefactions*

of

of the *Bodies* of Men, and *Living Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Vicers both Inwards and Outwards,) they are a great *Part* of *Physicks*, and *Surgery*: And therefore we will referue the *Enquiry* of them to the proper Place, where we shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an *Enquiry*: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Remouing that, which caused *Putrefaction*, doth Preuent and Auoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so wee see that Meat and Drinke will last longer, Vnputrified, or Vnflowred, in Winter, than in Summer: And wee see that Flowers, and Fruits, put in Conseruatories of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*.

The Second is *Astringition*: For *Astringition* prohibiteth *Dissolution*: As wee see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibit *Putrefaction*: And by the same reason of *Astringency*, some small Quantity of Oile of Vitrioll, will keepe Fresh Water long from *Putrefying*. And this *Astringition* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same *Meanes* that Cold doth.

The Third is, the Excluding of the *Aire*; And againe, the *Exposing to the Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subiect Matter. So wee see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners* under Ground keepe Corne longer than those aboue Ground; And that *Fruit closed in Waxe* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, wee see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; And the Diuersity is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*.

The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrell, and their Parts together; As wee see that Turning ouer of Corne in a Garner; Or Letting it runne like an Houre-glasse, from an vpper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens *Bodies* Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before.

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The Fifth is, the *Breathing forth of the Aduentitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Conuenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the *Shade*; Or dried in the hot *Sunne*, for a small time, keepe best. For the *Emission* of the *Loose* and *Aduentitious Moisture*, doth betray the *Radicall Moisture*; And carryeth it out for Company.

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The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a *Strong Spirit* likewise preserveth, and a *Weake* or *Faint Spirit* disposeth to *Corruption*. So we finde that *Salt-water* corrupteth not so soone as *Fresh*: And *Salting* of *Oysters*, and *Powdring* of *Meat*, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy *Souring*. So wee see that *Strong Beere* will last longer than *Small*; And all Things, that are hot and *Aromaticall*, doe helpe to preserve *Liquours*, or *Powders*, &c. Which they doe, as well by *Strengthening the Spirits*, as by *Soaking out the loose Moisture*:

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The Seuenth is, *Separation of the Cruder Parts*, and thereby making the *Body more Equall*; for all vnperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oily. So we see *Distilled Waters* will last longer than *Raw waters*; And Things that haue passed the *Fire*, doe last longer, than those that haue not passed the *Fire*; As *Dried Peares*, &c.

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The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and watry Moisture*; Not onely for the Reason before giuen, that it prouoketh the *Radicall Moisture* to come forth with it; But because being detained in the *Body*, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preseruing Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

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The Ninth is, the *Commixture of any Thing that is more Oily, or Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little vpon them; And they not putrefying preserve the rest. And therefore we see *Syrups*, and *Ointments*, will last longer, than *Juyces*.

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The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is vnapt to putrefie: And therefore *Smoake* preserveth *Flesh*; As wee see in *Bacon*, and *Neats-Tongues*, and *Martlemas Beefe*, &c.

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The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve *Bodies*, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being *Ouer-charged* and *Compressed*, will hardly receiue the *Exhaling* of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto *Flesh* was put, and likewise a *Flower*, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction*: The way were therefore, to blow strongly, with a Pair of Bellowes, into a Hogthead, putting into the Hogthead (before) that which you would haue preserved; And in the instant that you withdraw the Bellowes, stop the Hole close.

The *Experiment* of Wood that *Shineth* in the *Darke*, we haue diligently diuised, and pursued: The rather, for that of all Things, that giue Light here below, it is the most Durable; And hath least Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* shineth onely while it is in Scraping; And *Salt-water* while it is in Dashing; *Glow-wormes* haue their Shining while they liue, or a little after; Onely *Scales of Fishes* (Purified) seeme to be of the same Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* sorteth thus. 1. The *Shining* is in some Peeces more *Bright*, in some more *Dimme*; but the most *Bright* of all doeth not attaine to the Light of a *Glow-worme*. 2. The Woods that haue beene tried to shine, are chiefly *Sallow*, and *Willow*; Also the *Alb*, and *Haffe*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe shine, but the *Roots* better. 4. The Colour of the *Shining Part*, by Day-light, is in some Peece *White*, in some Peeces inclining to *Red*; Which in the Countrey they call the *White*, and *Red Garret*. 5. The Part that Shineth, is, (for the most part) somewhat *Soft*, and *Mais* to feele to; But some was found to be *Firme* and *Hard*; So as it might be figured into a Crosse, or into Beads, &c. But you must not looke to haue an Image, or the like, in any Thing that is Lightsome; For euen a face in Iron red Hot will not be seene, the Light confounding the small differences of Lightsome and Darksome, which shew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began also to Shine, being laid abroad in the Dew; So as it seemeth the *Putrefaction* spreadeth. 7. There was other dead Wood of like kinde, that was Laid abroad, which Shined not at the first; But after a Nights lying abroad began to Shine. 8. There was other Wood, that did First shine; And being laid dry in the House, within five or six daies, Lost the Shining; And laid abroad againe, Recovered the Shining. 9. *Shining woods*, being laid in a Dry Room, within a Seuen night, lose their Shining; But being laid in a Cellar, or Darke Room, kept the Shining. 10. The Boring of Holes, in that kinde of Wood, and then lying it abroad, seemeth to conduce to make it Shine: The Cause is, for that all Solution of Continuity doth helpe on *Putrefaction*, as was touched before. 11. No Wood hath beene yet tried to Shine, that was cut downe a line, but such as was Rotted, both in Stocke, and Root, while it grew. 12. Part of the Wood that Shined, was steeped in Oyle, and retained the Shining a Fortnight. 13. The like succeeded in some steeped in Water, and much better. 14. How long the Shining will continue, if the Wood be laid abroad euery Night, and taken in and sprinkled with Water in the Day, is not yet tried. 15. Triall was

Experiment
Solitary, touching
Wood
Shining in the
Darke.

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Lost

made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a *drie Roome*, it got a *Shining*.

Experiment
Solitary tou-
ching the *Accel-*
eration of Birth

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The *Bringing forth* of *living Creatures* may be *accelerated* in two *Respects*: The one, if the *Embryon ripeneth* and *perfecteth* sooner: The other if there be some *Cause* from the *Mother's Body*, of *Expulsion* or *Putting it downe*: whereof the *Former* is good, and argueth *Strength*; The *Latter* is ill, and commeth by *Accident* or *Disease*. And therefore the *Ancient Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is *Fabulous*; Which is, that in the *Eighth Moneth*, should be the *Returne* of the *Raigne*, of the *Planet Saturne*: which (as they say) is a *Planet Maligne*; whereas in the *Seventh* is the *Raigne* of the *Moone*, which is a *Planet Propitious*. But the true *Cause* is, for that where there is so great a *Prevention* of the *Ordinary time*, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment
Solitary tou-
ching the *Accel-*
eration of
growth and
Stature.

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To *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plentie* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the *Childe Corpulent*; And *Growing* in *Breadth*, rather than in *Heighth*. And you may take an *Experiment* from *Plants*, which, if they *spread* much, are *seldome* tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore *Children* in *Dayrie Countries* doe wax more tall, than where they feed more vpon *Bread*, and *Flesh*. There is also a received *Tale*; That *Boyling* of *Dasie Roots* in *Milke* (which it is certaine are great *Driers*) will make *Dogs* little. But so much is true, that an *Over-drie Nourishment* in *Childhood* putteth backe *Stature*. Secondly, the *Nourishment* must be of an *Opening Nature*; For that *Attenuateth* the *Iuice*, and furthereth the *Motion* of the *Spirits*, vpwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their *Feeding* vpon *Cardamon*; which (hee saith) made them grow better, and be of a more *Active Habit*. *Cardamon* is in *Latine Nasturtium*; And with vs *Water-Cresses*; Which, it is certaine, is an *Herbe*, that whilest it is young, is *Friendly* to *Life*. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much *Going* to *Schoole*, where they sit so much, hindreth the *Growth* of *Children*; whereas *Countrey People*, that goe not to *Schoole*, are commonly of better *Stature*. And againe *Men* must beware, how they giue *Children*, any thing that is *Cold* in *Operation*; For euen *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tried, that a *Whelp*, that hath beene fed with *Nitre* in *Milke*, hath be-

come

come very little, but extreme lively : For the *Spirit of Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life ; yet it is, in Children and young Creatures, an Enemy to *Growth* : And all for the same Reason ; For *Heat* is requisite to *Growth* : But after a Man is come to his Middle Age, *Heat* consumeth the *Spirits* ; which the Coldness of the *Spirit of Nitre* doth helpe to condense, and correct.

There betwixt two Great Families of Things ; You may terme them by severall Names ; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words : (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two ;) *Inflammable* and *Not Inflammable* ; *Mature* and *Crude* ; *Oily* and *Watry*. For we see that in *Subterraneities* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury* : In *Vegetables*, and *Living Creatures* there is *Water* and *Oyle* : In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame* : And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to haue many Consents : For *Mercury* and *Sulphure* are principall Materialls of *Metalls* ; *Water* and *Oyle*, are principall Materialls of *Vegetables*, and *Animals* ; And seeme to differ but in *Maturation*, or *Concoction* : *Flame* (in *Vulgar Opinion*) is but *Aire Incensed* ; And they both haue Quickness of Motion, and Facility of Cession, much alike : And the *Interstellar Sky*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Iuyce*, into *Oile* or *Oily Iuyce* : Greater in Nature, than to turne *Siluer*, or *Quick-siluer*, into *Gold*.

The Instances we haue, wherein *Crude* and *Watry* Substance turneth into *Eat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water* ; which mingled by the helpe of the Sunne, gather a Nitrous Fatnesse, more than either of them haue severally ; As we see, in that they put forth *Plants*, which need both Iuyces.

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures* ; Whereof *Plants* turne the Iuyce of meere *Water* and *Earth*, into a great deale of *Oily Matter* : *Living Creatures* ;

Experiments
in Confort
touching Sul-
phur and Mer-
cury, two of Pa-
raclesius Prin-
ciples.

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tures, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*, (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Versio* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

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The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which haue a kinde of *Fatnesse*, or *Oyle*.

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The Fourth is in the *Dulcoration* of some *Metalls*; As *Saccharum Saturni*, &c.

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The Intention of *Versio* of *Water* into a more *Oily Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water digested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Again, it may be by *Prouocation*, or *Excitation*; Which is caused by the Mingling of Bodies already *Oily*, or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Digested*; As in *Plants*, and *Living Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compasse, as hath bene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leaue it to the *Title* of *Versio* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assembly of Estates, doth giue Law to all *Bodies*.

Experiment
Solitary touch-
ing *Chamele-
ons*.

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A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head vnproportionably bigge; His Eyes great: He moueth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skin spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a maruellous Length in respect of his Body, and hollow at the end; Which he will launch out to prey vpon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If hee be laid vpon Greene, the Greene predominateth; If vpon Yellow, the Yellow; Not so if he be laid vpon Blew, or Red, or White; Onely the Greene Spots receiue a more Orient Lustre: Laid vpon Blacke, he looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely vpon Aire, (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that haue kept *Chameleons* a whole yeare together, could neuer perceiue that euer they fed vpon any Thing else but Aire; And might obserue their Bellies to swell after they had exhausted the Aire, and closed their Iawes; Which they open commonly

monly against the Rayes of the Sunne. They haue a foolish Tradition in *Magicks*, that if a *Chameleon* be burnt vpon the Top of a House, it will raise a Tempell; Supposing (according to their vaine Dreames of *Symphizies*) because he nourisheth with Aire, his Body should haue great vertue to make Impression vpon the Aire.

It is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that those *Flames* are cleare, and cast not forth such Smoake, and Ashes, and Pumice, as *Mountain* *Flames* doe. The Reason (no doubt) is, because the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which cast *Flame*. There be also some *Blinde Fires*, vnder *Stone*, which flame not out, but *Oile* being powdered vpon them, they flame out. The Cause whereof is, for that it seemeth, the *Fire* is so choked, as not able to remoue the *Stone*, it is *Heat*, rather than *Flame*; Which neuertheless is sufficient to Enflame the *Oyle*.

It is reported, that in some *Lakes*, the *Water* is so *Nitrous*, as if Foule Chumtis be put into it, it scoureth them of it selfe: And if they stay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, because it is a *Body Cold*; And we see *Warre Water* scoureth better than *Cold*. But the Cause is, for that it hath a Subtill Spirit, which seuereth and diuideth any thing that is foule, and Viscous, and sticketh vpon a Body.

Take a *Bladder*, the greatest you can get; Fill it full of Winde, and tye it about the Necke with a Silke thred waxed; And vpon that put likewise Wax very close; So that when the Neck of the *Bladder* dryeth, no *Aire* may possibly get in, nor out. Then bury it three or foure foot vnder the *Earth*, in a *Fault*, or in a *Conseruatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after some Fortnights distance, see whether the *Bladder* be thruncke: For if it be, then it is plaine, that the *Coldnesse* of the *Earth*, or *Snow*, hath Condensed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Consequence.

It is a Report of some good credit, that in *Deepe Caues*, there are *Pensile Crystall*, and *Degrees of Crystall* that drop from aboue; And in some other, (though more rarely) that rise from below. Which though it be chiefly the Worke of Cold, yet it may be, that *Water*, that passeth thorow the *Earth*, gathereth a Nature more clammy, and fitter to Congeale, and become Solide, than *Water* of it selfe. Therefore Triall would be made, to lay a Heape of *Earth*, in great Frosts, vpon a Hollow Vessell, putting a Canuase betweene, that it falleth not in: And poure *Water* vpon it, in such Quantitie, as will be sure to soake thorow; And see whether it will not make an harder Ice in the bottome of the Vessell, and

Experiment
Solitary, touch-
ing Subterra-
ny Fires.

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Experiment
Solitary, touch-
ing *Nitre*.

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Experiment
Solitary touch-
ing Congeal-
ing of *Aire*.

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Experiment
Solitary touch-
ing Congeal-
ing of *Water*
into *Crystall*.

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and lesse apt to dissolue, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reuerfed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And euermore Smalnesse of Quantity is a Helpe to *Version*.

Experiment
Solitary touching
Preseruing of Rose-
leaves, both in
Colour, & Smell.

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Take *Damaske Roses*, and pull them; Then dry them vpon the Top of an House, vpon a Lead or Tarras, in the hot Sunne, in a cleare day, betweene the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet Dry *Earthen Bottle*, or a *Glasse*, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other Body, either by *Putrefaction*, or *Arefaction*, as the *Aduentitious Moisture*, which hangeth loose in the Body, if it be not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Liuing Creatures*, Moderate Sweat doth preserue the Iuyce of the Body. Note that these *Roses*, when you take them from the *Drying*, haue little or no *Smell*; So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments
in Consort,
touching the
Continuance of
Flame.

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The *Continuance of Flame*, according vnto the diuersity of the *Bodies Enflamed*, and other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiue the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation*. A Spoonfull of *Spirit of Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit of Wine*, Mixed with the Sixth Part of a Spoonfull of *Nitre*, burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolued into a Blacke water, 110. Pulses. A Cube, or Pellet of *Yellow Wax*, was taken, as much as halfe the *Spirit of Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonfull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonfull of *Water*, it burnt to the space of 86. Pulses; With an *Equall Quantity of Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set vp in the Middest, and the *Spirit of Wine* burnt to the space of 94. Pulses. So that the *Spirit of Wine Simple*, endured the longest; And the *Spirit of Wine* with the *Bay-salt*, and the *Equall Quantity of Water*, were the shortest.

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Consider well, whether the more speedy *Going forth of the flame*, be caused,

caused, by the Greater *Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the Quantitie of the *Spirit of Wine*, that remaineth after the Going out of the *Flame*. And it seemeth cleerely to be the latter; For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit of Wine* burned, till it goe out of it selfe, will burne no more; And tasteth nothing so hot in the Mouth, as it did: No nor yet sowre, (as if it were a degree towards *Vinegar*;) which *Burnt Wine* doth; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it selfe, with the *Spirit of Wine*, to produce one *Flame*; but wheresoever the *Wax* floored, the *Flame* forsooke it, till at last it spread all ouer, and put the *Flame* quite out.

The *Experiments* of the *Mixtures* of the *Spirit of Wine* enflamed, are Things of discovery, and not of Use: But now wee will speake of the Continuance of *Flames*, such as are vsed for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *Wicke* that prouoketh *Inflammation*. And this importeth not only Discovery, but also Use and Profit; For it is a great Saving, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* severally into Candle-stuffe, with the Particulars that follow; (*viz. Water, Aqua-vita, Milke, Bay-salt, Oyle, Butter, Nitre, Brimstone, Saw-dust*;) Every of these bearing a Sixth Part to the *Wax*; And euery of these *Candles mixed*, being of the same Weight and *Wicke* with the *Wax Pure*, proued thus in the Burning, and Lasting. The Swiftest in Consuming was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the Dust gathered about the Snafte; But then it made the Snafte bigge, and long, and to burne duskily, and the *Candle* wasted in halfe the time of the *Wax Pure*. The next in Swiftnesse, were the *Oyle*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare Wax*. Then followed the *Aqua-vita*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vita*, but the *Water* slowest. And in these foure last, the *Wicke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted aboue some Twelue Pulses; But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same time with the *Nitre*; But then after a little while, it would harden and cake about the Snafte; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of lasting, and the *Water* a Fifth.

After the Seuerall *Materials* were tried, Triall was likewise made of seuerall *Wickes*; As of Ordinary Cotton; Sowing Thred; Russ; Silke; Straw; and Wood. The *Silke*, *Straw*, and *Wood*, would flame a little, till they

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they came to the *Wax*, and then goe out : of the Other Three, the *Thred* consumed faster than the *Cotton*, by a Sixth part of Time : The *Cotton* next : Then the *Ruff* consumed slower than the *Cotton*, by at least a third part of time. For the Bignesse of the *Flame*, the *Cotton*, and *Thred*, cast a *Flame* much alike ; and the *Ruff* much lesse, and dimmer. *Quare*, whether *Wood*, and *Wickes* both, as in *Torches*, consume faster, than the *Wickes Simple*?

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We haue spoken of the Seuerall *Materialls*, and the Seuerall *Wickes* : But to the *lasting* of the *Flame*, it importeth also ; Not only what the *Materiall* is, but in the same *Materiall*, whether it be Hard, Soft, Old, New, &c. Good *Houſewines*, to make their *Candles* burne the longer, vse to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and so they Consume the slower : Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame *Stuffe*, almoſt Halfe in Halfe. For *Bran* and *Flower* haue a Vertue to Harden : So that both Age, and lying in the *Bran*, doth helpe to the *Laſting*. And wee ſee that *Wax Candles* laſt longer than *Tallow Candles*, becauſe *Wax* is more firme, and hard.

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The *Laſting* of *Flame* alſo dependeth vpon the *eaſie Drawing* of the *Nouriſhment* ; As we ſee in the *Court of England*, there is a Seruice which they call *All-night* ; which is (as it were) a great Cake of *Wax*, with the *Wicke* in the Middleſt ; whereby it commeth to paſſe, that the *Wicke* fetcheth the *Nouriſhment* further off. Wee ſee alſo that *Lamps* laſt longer, becauſe the *Veſſell* is farre broader, than the *Bredth* of a *Taper*, or *Candle*.

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Take a *Turretted Lampe* of *Timme*, made in the forme of a *Squire* ; The Height of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth : Make only one Hole in it, at the End of the Returne furtheſt from the *Turret*. Reuerſe it, and fill it full of *Oile*, by that Hole ; And then ſet it vpright againe ; And put a *Wicke* in at the Hole ; And lighten it : You ſhall finde, that it will burne ſlow, and a long time. Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment* a farre off. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with *Aire* ; which is cauſed by the Rarefaction of the *Oile* by the Heat. It were worthy the Obſeruatiſon, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt consumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enſlame. It were good alſo to haue the *Lampe* made, not of *Timme*, but of *Glaſſe*, that you may ſee how the Vapour, or *Aire* gathereth, by degrees, in the Top.

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A fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. Wee ſee, that if *Wind* bloweth vpon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at large. And there are Traditions of *Lamps*, and *Candles*, that haue burnt a very long time, in *Caves*, and *Tombes*.

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A Fifth Point, that importeth the *Laſting* of the *Flame*, is the Nature
of

of the *Aire*, where the *Flame* burneth ; whether it be Hot or Cold ; Moist or Drie. The *Aire*, if it be very Cold, irritateth the *Flame*, and maketh it burne more fiercely ; (As Fire scorchereth in Frostie weather ;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceiue) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be Drie, is indifferent : The *Aire*, if it be Moist, doth in a Degree quench the *Flame* : (As wee see *Lights* will goe out in the *Damps* of *Stones* :) And howsoeuer maketh it burne more dully : And so helpeth the *Continuance*.

Burials in *Earth* serue for *Preseruation* ; And for *Condensation* ; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may burie the *Bodies* so, as *Earth* may touch them : As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conseruation*, if the *Bodies* be Hard, and Solid ; As Clay, Wood, &c. But if you intend *Preseruation* of *Bodies*, more Soft and Tender, then you must doe one of these two : Either you must put them in *Cases*, whereby they may not touch the *Earth* ; Or else you must vault the *Earth*, whereby it may hang ouer them, and not touch them ; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserue them ; Except the *Earth* be very Drie, and Sandie.

An *Orange*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure Foot deepe within the *Earth*, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes Mouldie, or Rotten, but were become a little harder than they were ; Otherwise fresh in their Colour ; But their Iuyce somewhat flatted. But with the *Buriall* of a Forthnight more they became Putrified.

A *Bottle* of *Beere*, buried in like manner, as before, became more liuely, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more liuely, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and liuely, if not better, than before.

It were a profitable *Experiment*, to preserue *Oranges*, *Lemons*, and *Pomegranates*, till Summer ; For then their Price will be mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the Moisture of the *Earth* come not at them ; Or else by putting them in a *Conseruatorie* of *Snow*. And generally, whosoever will make *Experiments* of Cold, let him be prouided of three Things ; A *Conseruatorie* of *Snow* ; A good large *Vault*, twenty foot at least vnder the Ground ; And a *Deepe Well*.

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that haue lost their Colours, may be recovered by *Burying* in the *Earth* : Which is a thing of great profit, if it would sort : But vpon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it,

Experiments
in Consort
touching *Eu-
rials* or *Insigni-
ons* of diuers
Bodies in *Earth*.

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in a *Deepe Well*; Or in a *Conseruatory* of *Snow*, where the *Cold* may be more *Constringent*; And to make the *Body* more *vaited*, and thereby more *Resplendent*.

Experiment
Solitary, touch-
ing the Af-
fects in *Winters*
and *Summer*
Winds.

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Men's Bodies are heavier, and lesse disposed to Motion, when *Southerne Winds* blow, than when *Northerne*. The Cause is, for that when the *Southerne Winds* blow, the *Humours* doe (in some Degree) melt, and waxe fluid, and so flow into the Parts, As it is seene in *Wood*, and other *Bodies*, which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the *Body* consisteth chiefly in the *Sinewes*, which, when the *Southerne Wind* bloweth, are more relaxe.

Experiment
Solitary touch-
ing *Winter*
and *Summer*
Sicknesses.

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It is commonly seene, th it more are *Sick* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*: But then they are Cured most by *Sweat*, and *Purge*; which in the *Summer* commeth on, or is prouoked, more Easily: As for *Pestilent Diseases*, the Reason why most *Dye* of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touch'd are in most Danger in the *Winter*.

Experiment
Solitary touch-
ing *Pestilent*
all *Seasons*.

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The Generall Opinion is, that *Tears Hot* and *Moist*, are most *Pestilent*; Vpon the Superficiall Ground, th it *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there haue bene great *Plagues* in *Dry Tears*. Whereof the Cause may be, for that *Drought* in the *Bodies* of *Islanders*, habituate to *Moist Aires*, doth Exasperate the *Humours*, and maketh them more apt to *Putrifie*, or *Enflame*: Besides, it tainteth the *Waters* (commonly) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake vp in the *Summer-months*, when the *Weather* is *Hot* and *Dry*.

Experiment
Solitary, touch-
ing an *Error*
received about
Epidemicall Dis-
eases.

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Many *Diseases*, (both *Epidemicall*, and others,) breake forth at *Particular times*. And the Cause is falsely imputed to the *Constitution* of the *Aire*, at that time, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue vpon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment
Solitary, touch-
ing the Alter-
ation or Prefer-
uation of Li-
quours in *Wells*,
or *deepe Vaults*.

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Triall hath bene made, with *Earthen Bottles* well stopp'd, hanged in a *Well* of *Twenty Fathome* deepe, at the least; And some of the *Bottles* haue bene let downe into the *Water*, some others haue hanged aboue, within about a fathome of the *Water*; And the *Liquours* so tried haue bene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Prooff hath bene, that both the *Beere*, and the *Wine*, (as well within *Water*, as aboue,) haue not bene pall'd or dead'd at all; But

as

as good, or better, than *Bottles* of the same *Drinks*, and *Stale* neither, as in a *Cave*. But those which did hang about *Water*, were apparently stinking; And that *Beere* did flower a little; whereas that under *Water* did not, though it were *Fresh*. The *Milke* towered, and began to *Putrify*. Nevertheless it is said, that there is a *Village* neare *Blais*, where in *Beere Caves* they doe slighten *Milke*; in such sort, that it becommeth very pleasant; Which was some *Cause* of this *Triall* of *Hanging Milke* in the *Well*: But our prooffe was naught; Neither doe I know, whether that *Milke* in those *Caves*, be first *Boyled*. It were good therefore to try it with *Milke* *Sodden*, and with *Cream*; For that *Milke* of it selfe is such a *Composing Body*, of *Creame*, *Curds*, and *Whey*, as it is easily *Turned*, and *Dissolved*. It were good also to try the *Beere*, when it is in *Wart*, that it may be seene, whether the *Hanging* in the *Well*, will *Accelerate* the *Ripening* and *Clarifying* of it.

Diuers, we see, doe *Stut*. The *Cause* may be, (in most,) the *Refri-geration* of the *Tongue*; Whereby it is less apt to moue. And therefore we see, that *Naturalls* doe generally *Stut*: And we see that in those that *Stut*, if they drinke *Wine* moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first *Onset* to speake, than in *Continuance*; Because the *Tongue* is, by *Motion*, somewhat heated. In some also, it may be, (though rarely,) the *Driness* of the *Tongue*; which likewise maketh it lesse apt to moue, as well as *Cold*; For it is an *Affect* that commeth to some *Wise* and *Great Men*; As it did vnto *Moses*, who was *Lingua praeputa*; And many *Stutters* (we finde) are very *Cholericke Men*; *Choler* Enducing a *Driness* in the *Tongue*.

Smells, and other *Odours*, are *Sweeter* in the *Aire*, at some *Distance*, than neare the *Nose*; As hath bene partly touched heretofore. The *Cause* is double: First the finer *Mixture*, or *Incorporation* of the *Smell*: For we see that in *Sounds* likewise, they are *Sweetest*, when we cannot heare euery *Part* by it selfe. The other *Reason* is, for that all *Sweet Smells* haue ioyned with them, some *Earthy* or *Crude Odours*; And at some *distance* the *Sweet*, which is the more *Spiritually*, is Perceiued; And the *Earthy* reacheth not so farre.

Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenge*s, or *Limons*, the *Nipping* of their *Rinde*, giueth out their *Smell* more: And generally, when *Bodies* are *Moued* or *Stirred*, though not *Broken*, they *Smell* more; As a *Sweet-Bagge* waied. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when *Wav* is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some *Degree*) in the *Mouing*: But in this last, there is a *Concurrence* of the *Second Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster vpon vs.

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaues* *smell*

Experiment
Solitary, tou-
ching *Stuttering*

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Experiments
in Consort,
touching
Smells.

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smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pinckes*, *Wool-bines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The Cause is, for that where there is Heat and strength enough in the Plant, to make the *Leaves* *Odorate*, there the *Smell* of the Flower is rather Euanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Laurender-Flowers*, and *Sweet-Briar-Roses*. But where there is lesse Heat, there the *Spirit* of the Plant, is digested and refined, and seuered from the Grosser Iuyce, in the *Efflorescence*, and not before.

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Most *Odours* smell best, *Broken* or *Crusht*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe lesse the Freshnesse and Sweetnesse of their *Odour*. The Cause is, for that when they are *Crusht*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments
in Confort
touching the
Goodness and
Choice of Water.

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It is a Thing of very good Use, to Discouer the Goodnesse of *Waters*. The *Taste*, to those that Drinke *Water* onely, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you may account the Better.

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Secondly, try them by *Boyling* vpon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

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Thirdly, try them in *Seuerall Bottles*, or Open Vessells, Matches in euery Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth Vnputrified longest, you may likewise account the Best.

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Fourthly, try them by *Making Drinckes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *Water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it be not so good for *Medicinnall use*. And such *Water* (commonly) is the *Water* of *Large* and *Nauigable Riuer*s: And likewise in *Large* and *Cleane Ponds* of *Standing water*: For vpon both them, the Sunne hath more power, than vpon *Fountaines*, or *Small Riuer*s. And I conceiue that *Chalke water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it be out of a *Deepe Well*; For then it Cureth the Rawnesse of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in *Laundry* of *Cloaths*, which weare out apace, if you vse such *Waters*.

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Fifthly, The *Houswiues* doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the Viscuous Nature of the *Soape*.

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Sixthly, you may make a Iudgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Rain-Water* is, by the *Physicians*, esteemed the Finest, and the best; But yet it is said to putrifie soonest; which is likely, because of the Finenesse of the *Spirit*: And in *Conservatories*,

peruities of *Raine-water*, (such as they haue in *Venice*, &c.) they are found not so *Choice Waters*; The worse, (perhaps,) because they are Couered aloft, and kept from the Sunne. *Snow-water* is held vnwholesome; In so much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwise vpon the Ascent, (especially the Women,) by drinking of *Snow-water*, haue great Bagges hanging vnder their Throats. *Well-water*, except it be vpon *Chalke*, or a very plentiful Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *Hill-Hills* are the best: For both they seeme to haue a Lightnesse, and Appetite of Mounting; And besides they are most pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, ioine in effect vnder Ground with all *Waters* of the same Leuell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *Waters*.

Seuenthly, Iudgement may be made of *Waters* by the *Soyle* where-upon the *Water* runneth; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* vpon *Chalke*; Fourthly, that vpon *Sand*; And Worst of all vpon *Mudde*. Neither may you trust *Waters* that Taste Sweet; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth.

In *Pera*, and diuers Parts of the *West Indies*, though vnder the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are vnder the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compensate the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For vnder the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and so maketh one Long Summer.

The *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Aethiopia*, and *Ginny*, &c. *Fire* doth it not, as wee see in *Glasse-Men*, that are continually about the *Fire*. The *Reason* may be, because *Fire* doth licke vp the *Spirits*, and Bloud of the Body, so as they Exhale; So that it euer maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud

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Experiment
Solitary, touching the Temperature Heat vnder the Equinoctiall.

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Experiment
Solitary, touching the Coloration of Blacke and Tawney Moores.

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to

to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee see that all *Ethiopes* are Flefhy, and Plumpe, and haue great Lips; All which betoken *Moisture* retained, and not drawne out. Wee see also, that the *Negroes* are bred in Countries that haue Plenty of *Water*, by *Riuers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Ethiopia*, was vpon a great Lake: And *Congo*, where the *Negroes* are, is full of *Riuers*. And the *Confines* of the *Riuer Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through *Moisture*: But the Countries of the *Abyssenes*, and *Barbary*, and *Pern*, where they are Tawney, and Oliuaster, and Pale, are generally more Sandy, and Dry. As for the *Ethiopes*, as they are Plumpe, and Flefhy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would suffer it to be seene.

Experiment
Solitary touching
Motion
after the Instant
of Death.

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Some *Creatures* doe moue a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some moue, though cut in seuerall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of Death, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the *Spirits* doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a Report also of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the *Palm* of a *Mans* hand, trembling, without breaking any part of it, or seuering it from the *Marrow* of the *Back-bone*; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the *Skull* of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* vpon *Reuenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerue*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they moue little or Nothing. But *Birds* haue small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Esrich*, as shee ranne swiftly vpon the Stage, and strooke off her Head;

And

And yet shee continued the Race, a little way, with the Head off.
 As for *Wormes*, and *Elies*, and *Eeles*, the *Spirits* are diffused al-
 most all ouer; And therefore they moue in
 their Seuerall Pieces.

P

NATV-





NATVRALL HISTORIE.

V. Century.



E will now enquire of *Plants* or *Vegetables* : And we shall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation* : For the other Words are but the Words of *Effence* ; And they are of excellent and generall Use,

for Food, Medicine, and a Number of Mechanicall Arts.

There were sown in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* we call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted ; This was laid vpon a Banke, halfe a foot high, and supported round about with Planks ; And vpon the Top was cast Sifted Earth, some two Fingers deepe ; And then the *Seed* sprinkled vpon it, hauing beene steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came vp halfe an Inch aboue Ground, within two dayes after, without any Warring. The Rest the third day. The *Experiment* was made in *October* ; And (it may be) in the *Spring*, the *Accelerating* would haue beene the speedier. This is a Noble *Experiment* ; For without this helpe, they would haue

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in Confort,
touching the
Acceleration of
Germination.

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beene foure times as long in coming vp. But there doth not occurre to me, at this present, any vse thereof, for profit ; Except it should be for Sowing of *Pease* ; which haue their Price very much increased, by the early Coming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are dearest, when they come early.

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There was *Wheat*, steeped in *Water* mixed with *Cow-Dung* ; Other in *Water* mixed with *Horse-Dung* ; Other in *Water* mixed with *Pigeon-Dung* ; Other in *Urine* of *Man* ; Other in *Water* mixed with *Chalke* powdered ; Other in *Water* mixed with *Soot* ; Other in *Water* mixed with *Asbes* ; Other in *Water* mixed with *Bay-Salt* ; Other in *Claret Wine* ; Other in *Malmsey* ; Other in *Spirit of Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *Water* ; Saue that there was not of the *Salt* aboue an eighth Part. The *Urine*, and *Wines*, and *Spirit of Wine*, were Simple without Mixture of *Water*. The Time of the Steeping was twelue houres. The Time of the Yeare *October*. There was also other *Wheat* sown vnsteeped, but watered twice a day with *Warne water*. There was also other *Wheat* sown Simple to compare it with the rest. The Event was ; That those that were in the Mixture of *Dung*, and *Urine*, and *Soot*, *Chalke*, *Asbes*, and *Salt*, came vp within six dayes : And those that afterwards proued the Highest, Thickest, and most Lustie, were ; First the *Urine* ; And then the *Dungs* ; Next the *Chalke* ; Next the *Soot* ; Next the *Asbes* ; Next the *Salt* ; Next the *Wheat Simple* of it selfe, vnsteeped, and vnwatered ; Next the *Watered twice a day* with warme water ; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe ; And this Culture did rather retard, than aduance. As for those that were steeped in *Malmsey*, and *Spirit of Wine*, they came not vp at all. This is a Rich Experiment for Profit ; For the most of the Steepings are Cheape Things ; And the Goodnesse of the Crop is a great Matter of Gaine ; If the Goodnesse of the Crop answer the Earlinesse of the Coming vp : As it is like it will ; Both being from the vigour of the Seed ; Which also partly appeared in the Former Experiments, as hath beene said. This Experiment would be tried in other Graines, Seeds, and Kernells : For it may be some Steeping will agree best with some Seeds. It would be tried also with *Roots* steeped as before, but for longer time. It would be tried also in *seuerall Seasons* of the Yeare, especially the *Spring*.

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Strawberries watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will preuent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an Experiment, though vulgar in *Strawberries*, yet not brought into vse generally : For it is vsuall to helpe the Ground with *Mucke* ; And likewise to Recomfort it sometimes with *Mucke* put to the *Roots* ; But to water it with *Mucke water*, which is like to be more Forcible, is not practised.

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Dung, or *Chalke*, or *Blond*, applied in Substance, (seasonably,) to the *Roots*

Roots of Trees, doth set them forwards. But to doe it vnto *Herbs*, without Mixture of *Water* or *Earth*, it may be these Helpes are too Hot.

The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the *Nourishment* better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are all the experiments that follow; Though they be not *Applications* to the *Root*, or *Seed*. The *Planting* of *Trees* warme vpon a *Wall*, against the *South*, or *South-East* *Sunne*, doth hasten their *Comming on*, and *Ripening*; And the *South-East* is found to be better than the *South-West*, though the *South-West* be the *Hatter Coast*. But the cause is chiefly, for that the *Heat* of the *Morning* succedeth the *Cold* of the *Night*: and partly, because (many times) the *South-west* *Sunne* is too *Parching*. So likewise the *Planting* of them vpon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their *Comming on*, and *Ripening*: Nay more, the *Drawing* of the *Boughes* into the *Insile* of a *Roome*, where a *Fire* is continually kept, worketh the same Effect; Which hath beene tried with *Grapes*; In so much as they will come a *Moneth* earlier, than the *Grapes* abroad.

Besides the two *Meanes* of *Accelerating Germination*, formerly described, That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a *Third*, Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Remouing* *Herbs* and *Flowers* into new *Earth*, once in two yeares, (which is the same thing, For the new *Earth* is euer looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damask Rose* with the *Root* on, was set in a *Chamber*, where no *Fire* was, vpright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot vnder the *Water*, the *Standard* being more then two foot high aboue the *Water*: Within the *Space* of ten dayes, the *Standard* did put forth a faire *Greene* leafe, and some other little *Buds*, which stood at a stay, without any Shew of decay or withering, more then seuen Daies. But afterwards that *Leafe* faded, but the young *Buds* did sprout on; which afterward opened into faire *Leaues*, in the space of three *Moneths*; And continued so a while after, till vpon Remouall wee left the *Triall*. But note that the *Leaues* were somewhat paler, and lighter-coloured, than the *Leaues* vse to be abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would haue put forth with greater strength, and (it may be) to haue growne on to beate *Flowers*. By this *Meanes*, you may haue, (as it seemeth,) *Roses* set in the wildest of a *Poole*, being supported with some stay; Which is Matter of *Rareness* and *Pleasure*, though of small Use. This is the more strange,

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strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse dung*, the *Horse-dung* about the fourth Part to the *Water*, and in foure Moneths space (while it was obserued) put not forth any *Leafe*, though diuers *Buds* at the first, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all vnder *Water*, some two or three Fingers deepe; And within seuen dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had al their *Leaues* cut almost close to the *Roots*; And within six weekes had faire *Leaues*; And so continued, till the end of *November*.

409 Note that if *Roots*, or *Pease*, or *Flowers*, may be *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Retournes*: For in some Grounds which are strong, you shall haue a *Raddish*, &c. come in a Month; That in other Grounds will not come in two; And so make double *Retournes*.

410 *Wheat* also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water*, as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casuallly some *Wheat* lay vnder the Pan, which was somewhat moistned by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

411 It seemeth by these *Instances* of *Water*, that for Nourishment, the *Water* is almost all in all, and that the *Earth* doth but keepe the *Plant* vp-right, and saue it from Ouer-heat, and Ouer-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proueth also that our former *Opinion*; That *Drinke* incorporate with *Flesh*, or *Roots*, (as in *Capon-Beere*, &c.) will nourish more easily, than *Meat* and *Drinke* taken seuerally.

412 The *Housing* of *Plants* (I conceiue) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as wee *House Hot Countrey Plants*, as *Lemons*, *Orenge*s, *Myrtles*, to saue them; So we may *House* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seasons; In such sort, that you may haue *Violets*, *Strawberries*, *Pease*, all Winter: So that you sow, or remoue them at fit times. This *Experiment* is to be referred vnto the *Comforting* of the *Spirits* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

To make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, hauing beene lesse exhaled by the Sunne. The *Meanes* are these. First, the *Cutting off their Tops*, immediately after they haue done Bearing; And then they will come againe the

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Putting backe or
Retardation of
Germination.

the same yeare about *November*: But they will not come iust on the Top, where they were cut, but out of those Shoots, which were, (as it were,) *Water-Boughes*. The Cause is, for that the Sap, which otherwile would haue fed the Top, (though after Bearing,) will, by the discharge of that, diuert vnto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The Cause is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diuersion of it to the Sprouts, that were not so forward.

The Third is the *Cutting off some few of the Top-Boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The Cause is, for that the Boughes doe helpe to draw vp the Sap more strongly; And we see that in Powling of Trees, many doe vse to leaue a Bough or two on the Top, to helpe to draw vp the Sap. And it is reported also, that if you graft vpon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish.

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The Cause is plaine, for that it doth arrest the Sap, from going vpwards, for a time; Which Arrest is afterwards released by the Couering of the Root againe with Earth; And then the Sap getteth vp, but later.

The Fifth is the *Remouing of the Tree*, some Moneth before it *Buddeth*. The Cause is, for that some time will be required after the *Remoue*, for the Resetling, before it can draw the Iuyce: And that time being lost, the Blossome must needs come forth later.

The Sixth is the *Grafting of Roses in May*, which commonly Gardiners doe not till *July*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late.

The Seuenth is, the *Girding of the Body of the Tree* about with some Pack-thread; For that also, in a degree, restraineth the Sap, and maketh it come vp, more late, and more Slowly.

The Eighth is, the *Planting of them in a Shade*, or in a *Hedge*; The Cause is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffle in the *Hedge*. These Meanes may be practised vpon other, both Trees, and Flowers, *Mutatis Mutandis*.

Men haue entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Coming Fruit*, vpon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach vpon a Cherry; And contrariwise, if an *Early-Coming-Fruit* vpon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare *Fruit late*; As a Cherry vpon a Peach. But these are but Imaginations, and vntrue. The Cause is, for that the Cions ouerruleth the Stocke quite; And the Stocke is but Passive onely, and giueth Aliment, but no Motion to the Graft.

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Experiments
in Consort
touching the
Melioration of
Fruits, Trees,
and Plants.

We will speake now, how to make *Fruits, Flowers*, and *Roots* larger; in more plenty; and sweeter; than they vse to be; And how to make the *Trees* themselues, more Tall; more Spread; and more Hasty and Sudden; than they vse to be. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serue much to these Purposes. And againe, that these *Experiments*, which we shall now set downe, doe serue also for *Acceleration*; because both Effects proceed from the Encrease of vigour in the Tree; But yet to auoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, wee will handle them apart.

422

It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottom* of a *Wilde-Tree*, (as an *Oake*, *Elme*, *Ash*, &c.) vpon the first Planting, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the Moisture, which falleth at any time vpon the *Tree*, and suffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quare*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giueth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will ouer-moisten the Roots, so as the Wormes will eat them.

423

A *Tree*, at the first *Setting*, should not be *Shaken*, vntill it hath *taken Root fully*: And therefore some haue put two little Forkes about the Bottom of their *Trees*, to keepe them vpriht; But after a yeares Rooting, then Shaking, doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

424

Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwise, the *Howling* and *Cutting* of the Top, maketh them grow spread, and bushy. As wee see in *Pollards*, &c.

425

It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of some seuen yeares growth; And to set them, not vpriht, but a-slope, a reasonable depth vnder the Ground; And then, in stead of one Root, they will put forth many, and so carry more Shoots vpon a Stemme.

426

When you would haue *many new Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his Branches a-flat vpon the Ground, and cast Earth vpon them; And euery Twigge will take Root. And this is a very profitable *Experiment* for *Costly Trees*; (for the Boughes will make *Stockes*

Stockes without charge;) Such as are *Apricots, Peaches, Almonds, Cornelians, Mulberries, Figs, &c.* The like is continually practised with *Vines, Roses, Musée-Roses, &c.*

From *May* to *July* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and couer the bare Place, somewhat aboue, and below, with Loame well tempered with Horfe-dung, binding it fast downe. Then cut off the Bough about *Alhollontide* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Year. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may be also that the Loame and Horfe-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping vp the *Sap* of *Trees* in their Boughes; Which may serue to other Effects.

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It hath beene practised in *Trees*, that shew faire, and beare not, to Bore a Hole thorow the Heart of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne *Sap*; For *Repletion* is an Enemy to Generation.

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It hath beene practised in *Trees*, that doe not beare, to cleaue two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a *Tree* may be (as it were,) Hide-bound, no lesse than the Body of the *Tree*; But it will not keepe open without somewhat put into it.

429

It is vsually practised, to set *Trees* that require much *Sunne*, vpon *Walls* against the *South*; As *Apricots, Peaches, Plums, Vines, Figs*, and the like. It hath a double Commodity; The one, the Heat of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the vpper Boughes ouer-shadow the lower; But when it is spread vpon a *Wall*, the *Sunne* commeth alike, vpon the vpper, and lower Branches.

430

It hath also beene practised (by some) to pull off some *Leaues* from the *Trees* so spread, that the *Sunne* may come vpon the *Bough* and *Fruit* the better. There hath beene practised also a Curiosity, to set a *Tree* vpon the *North-Side* of a *Wall*, and at a little height, to draw him thorow the *Wall*, and spread him vpon the *South-Side*: Conceiuing that the Root and lower Part of the Stocke should enioy the Freshnesse of the *Shade*; And the Vpper Boughes, and *Fruit*, the Comfort of the *Sunne*. But it sorted not; The *Cause* is, for that the *Root* requireth some Comfort from the *Sunne*, though vnder Earth, as well as the *Body*: And the Lower Part of the *Body* more than the Vpper, as wee see in Compassing a *Tree* below with Straw.

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The Lownesse of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall euer see in *Apricots, Peaches,*

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Peaches, or *Melo-Colones*, vpon a wall, the greatest Fruits towards the Bottom. And in *France* the *Grapes* that make the *Wine*, grow vpon low Vines, bound to small Stakes. And the raised Vines in Arbours make but Veriuyce. It is true, that in *Italy*, and other *Countries*, where they haue hotter Sunne, they raise them vpon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in vse there, their *Wines* would be stronger and sweeter. But it is more chargeable in respect of the Props. It were good to try whether a *Tree* grafted somewhat neare the Ground, and the lower boughes onely maintained, and the higher continually pruned off, would not make a larger *Fruit*.

433 To haue *Fruit* in *Greater Plenty*, the way is, to graft, not onely vpon young *Stockes*, but vpon diuers *Boughes* of an old *Tree*; for they will beare great Numbers of *Fruit*; Whereas if you graft but vpon one *Stocke*, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great means, both to the *Acceleration* and *Melioration* of *Fruits*, is practised in nothing but in *Vines*; Which if it were transferred vnto other *Trees*, and *Shrubs*, (as *Roses*, &c.) I conceive would aduance them likewise.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne vp (almost) by the *Roots*, and set vp againe, and the next yeare bare exceedingly. The *Cause* of this, was nothing but the *Loosening* of the *Earth*, which comforteth any *Tree*, and 's fit to be practised, more than it is, in *Fruit-Trees*: For *Trees* cannot be so fitly remoued into New Grounds, as *Flowers* and *Herbs* may.

436 To reuiue an *Old Tree*, the *Digging* of it about the *Roots*, and Applying new Mould to the *Roots*, is the way. We see also that *Draught-Oxen*, put into fresh Pasture, gather new and tender Flesh; And in all Things, better Nourishment than hath beene vsed, doth helpe to renew; Especially, if it be not onely better, but changed, and differing from the former.

437 If an *Herbe* be cut off from the *Roots*, in the beginning of Winter, and then the *Earth* be troden and beaten downe hard, with the Foot and Spade, the *Roots* will become of very great Magnitude in Summer. The Reason is, for that the Moisture being forbidden to come vp in the Plant, stayeth longer in the Root, and so dilateth it. And *Gardeners* vse to tread downe any loose Ground, after they haue sowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottom of a *Root*, it will cause the Root to grow to an Excessiue Bignesse. The *Cause* is, for that being it selfe of a Spungy Substance, it draweth the Moisture of the *Earth* to it, and so feedeth the Root. This is of greatest vse for *Onions*, *Turnips*, *Parfnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and *Fruit*; But with this Caution; That all Things doe prosper best, when they are aduanced to the better: Your *Nursery* of *Stockes* ought to be in a more Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Grassiers* preferre their Cattell from meaner Pastures to better. We see also, that Hardnesse in Youth lengthneth Life, because it lea- ueth a Cherishing to the better, of the Body, in Age : Nay in Exer- cises, it is good to begin with the hardest, as Dancing in Thicke Shooes, &c.

It hath beene obserued, that *Hacking* of *Trees* in their *Burke*, both downe-right, and acrosse, so as you make them rather in slices, than in continued Hacks, doth great good to *Trees*; And especially deliue- reth them from being *Hide-bound*, and killeth their Mousse.

Shade to some *Plants* conduceth to make them large, and prosperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongst *Strawberries*, sow here and there some *Borage-Seed*; And you shall finde the *Strawberries* vnder those *Leaues* farre more large than their Fellowes. And *Bayes* you must plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you sow the *Berries*, weed not the *Borders*, for the first halfe yeare; For the *Weed* giueth them *Shade*.

To increase the *Crops* of *Plants*, there would be considered, not only the *Increasing* the *Lust* of the *Earth*, or of the *Plant*, but the *Sauing* also of that which is spilt. So they haue lately made a *Triall*, to *See Wheat*; which neuerthelesse hath beene left off, because of the trouble and paines; Yet so much is true, that there is much saued by the *Setting*, in comparison of that which is *Sowen*; Both by keeping it from being picked vp by *Birds*; And by Auoiding the Shallow lying of it, where- by much that is sowen taketh no Root.

It is prescribed by some of the *Ancients*, that you take *Small Trees*, vpon which *Figs* or other *Fruit* grow, being yet vnripe, and couer the *Trees* in the Middle of *Autumne* with dung, vntill the Spring; And then take them vp in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the same kinde, doe but blossome. But this seemeth to haue no great Probabilitie.

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thicknesse of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will sprout forth within eight dayes. The *Cause* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contigu- ous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*.

Take *Seed*, or *Kernells* of *Apples*, *Peares*, *Orenge*s; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come vp much earlier than in the *Earth* it selfe. This I conceiue to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a *Graft* yeeldeth better prepared Nourishment to the *Graft*, than the Crude *Earth*; So the *Squill* doth the like to the *Seed*. And I suppose the same would be done, by Putting *Kernells* into a *Turnip*, or the

the like ; Saue that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion-Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in seuerall places, when it is almost at his *Bignesse*, and before it ripeneth, hath beene practised with successe, to ripen the *Fruit* more suddenly. Wee see the Example of the *Biting* of *Wasps*, or *Wormes*, vpon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put vnder the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Helpe to Fertilitye:

448 It hath beene practised, to cut off the *Stalkes* of *Cucumbers*, immediately after their *Bearing*, close by the Earth ; And then to cast a prettie Quantitie of Earth vpon the *Plant* that remaineth ; and they will beare the next yeare *Fruit*, long before the ordinary time. The *Cause* may be, for that the *Sap* goeth downe the sooner, and is not spent in the *Stalke* or *Leafe*, which remaineth after the *Fruit*. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annual*, seemeth to be partly caused by the Ouer-Expence of the *Sap* into *Stalke*, and *Leaues* ; which being preuented, they will super-annate, if they stand warme.

449 The *Pulling* off many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest ; For that the *Sap* hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree* ; Or the *Acornes* and *Chestnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit* ; Or else, the same yeares, larger *Leaues*, because of the *Sap* stored vp.

451 It hath beene generally receiued, that a *Plant* watered with *Warme Water*, will come vp sooner and better, than with *Cold Water*, or with *Showers*. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not ; which may be, because the *Triall* was too late in the *Yeare*, viz. in the End of *October*. For the *Cold* then comming vpon the *Seed*, after it was made more tender by the *Warme Water*, might checke it.

452 There is no doubt, but that *Grafting* (for the most Part) doth meliorate the *Fruit*. The *Cause* is manifest ; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth* : But yet note well, that there be some *Trees*, that are said to come vp more happily from the *Kernell*, than from the *Graft* ; As the *Peach*, and *Melocotone*. The *Cause* I suppose to be, for that those *Plants* require a Nourishment of great Moisture ; And though the Nourishment of the *Stocke* be finer, and

and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed we see those *Fruits* are very Cold *Fruits* in their Nature.

It hath beene receiued, that a Smaller *Pear*, grafted vpon a *Stocke* that beareth a greater *Pear*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* vpon the *Late Stocke*; And *à conuerso*; which wereiected before: For the *Cions* will gouerne. Neuerthelss it is probable enough, that if you can get a *Cions* to grow vpon a *Stocke* of another kinde, that is much moister than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is vpon a dryer *Stock*; As the *Apple* vpon a *Crab*; The *Pear* vpon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* vpon the *Stocke* of a *Colewort*, and it will beare a great flaggy *Apple*; The *Kernel* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to try, whether an *Apple Cions* will prosper, if it be grafted vpon a *Sallow*, or vpon a *Poplar*, or vpon an *Alder*, or vpon an *Elme*, or vpon an *Horse-Plumme*, which are the moistest of *Trees*. I haue heard that it hath beene tryed vpon an *Elme*, and succeeded.

It is manifest by Experience, that *Flowers* Remoued wax greater, because the Nourishment is more easily come by, in the loose *Earth*. It may be, that Oft Re-grafting of the same *Cions*, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it vpon a *Stocke* the first yeare; And then cut it off, and graft it vpon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting there are many Experiments worth the Noting, but those wereferue to a proper Place.

It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaues, haue his *Top* cut off. The *Cause* is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may be, the *Figge* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*.

It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Truncke* of the *Tree* thorow, in seuerall places, and thrust into the Places bored, *Wedges* of some Hot *Trees*, as *Turpentine*, *Masticke-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cause* may be, for that Aduenture Heat doth cheare vp the Native Iuyce of the *Tree*.

It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cause* may be the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinary *Composts*.

It is reported by one of the Ancients, that *Artichoakes* will be lesse prickly, and more tender, if the *Seeds* haue their *Tops* dulled, or grafted off vpon a *Stone*.

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Herbes will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come vp, and remoue them into *Pots*, with better *Earth*. The Remoue from *Bed* to *Bed* was spoken of before; But that was in feuerall yeares; This is vpon the sudden. The *Cause* is the same with other *Remoues*, formerly mentioned.

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Coleworts are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-Water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

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It is reported, that *Cucumbers* will proue more Tender, and Dainty, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the *Earth*, but onely the finer. The same *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their *Flashiness*, or *Bitternesse*. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

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It is reported that *Cucumbers* will be lesse Watry, and more *Melon-like*, if in the Pit where you set them, you fill it (halfe way vp) with *Chaffe*, or small *Sticks*, and then powre *Earth* vpon them; For *Cucumbers*, as it seemeth, doe extremely affect *Moisture*; And ouer-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about fife or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discouereth *Perception* in *Plants*, to moue towards that which should helpe and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other; For that *Water* may worke by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

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It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receiue Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coursest and vnprofitablest Iuyce; Euen as it is in *Liuing Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

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As *Terebration* doth Meliorate *Fruit*, so, vpon the like reason, doth Letting of *Plants* *Bloud*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration*, but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* haue beene turned into *Sweet*.

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The Ancients for the *Dulcorating* of *Fruits*, doe commend *Swines-Dung* above all other *Dung*; Which may be, because of the Moisture of that Beast, whereby the *Excrement* hath lesse Acrimony; For wee see *Swines* and *Pigges* Flesh is the Moistest of Fleshes.

It is objected by some, that all *Herbs* wax sweeter, both in Smell and Taste, if after they be growne vp some reasonable time, they be cut, and so you take the latter Sprout. The *Cause* may be, for that the longer the Iuyce stayeth in the Root, and Stalke, the better it concocteth. For one of the Choise Causes, why *Graines*, *Seeds*, and *Fruits*, are more Nourishing than *Leaves*, is the Length of time, in which they grow to *Maturation*. It were not amiss to keepe backe the Sap of *Herbs*, or the like, by some fit meanes, till the end of Summer; whereby (it may be) they will be more Nourishing.

As *Grafting* doth generally aduance and *Meliorate* *Fruits*, above that which they would be, if they were set of *Kernells*, or *Stones*, in regard the *Nourishment* is better concocted; So (no doubt) euen in *Grafting*, for the same cause, the Choise of the *Sticke* doth much; Always provided, that it be somewhat inferiour to the *Cions*: For otherwise it dulseth it. They commend much the *Grafting* of *Pearres*, or *Apples*, vpon a *Quince*.

Besides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is set downe as tryed, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (especially laid vp together for a Moneth to rot,) is a very great Nourisher, and Comforter to a *Fruit-Tree*.

It is deliuered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twenty dayes, and then set againe; And yet more, if the outermost Pill be taken off all ouer.

It is deliuered by some, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then Couer the *Pot* with Earth, it will yeeld a very large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Remouing, and Leauing the *Fruit* in the Earth. The like, (they say,) will be effected, by an Empty *Pot* without Earth in it, put ouer a *Fruit*, being propped vp with a *Stake*, as it hangeth vpon the *Tree*; And the better, if some few Pertusions be made in the *Pot*. Wherein, besides the Defending of the *Fruit*, from Extremity of Sunne or Weather, some giue a reason, that the *Fruit*, Louing and Coueting the open Aire and Sunne, is invited by those Pertusions, to spread and approach, as neare the open Aire, as it can; And so enlargeth in *Magnitude*.

All *Trees*, in *High* and *Sandy* Grounds, are to be set deepe; And in *Watry* Grounds, more shallow. And in all *Trees*, when they be remoued (especially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coasted, (*North* and *South*, &c.) as they stood before. The same is said also of *Stone* out of the *Quarry*, to make it more durable; Though that seemeth

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seemeth to haue lesse reason; Because the *Stone* lyeth not so neare the *Sunne*, as the *Tree* groweth.

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Timber Trees in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot vp still in Height; And chiefly because they are defended from too much *Sun* and *Wind*, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set vpon a *Wall*, against the *Sunne*, betweene Elbowes or Buttresses of *Stone*, ripen more, than vpon a *Plaine Wall*.

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It is said, that if *Potado Roots*, be set in a *Pot* filled with *Earth*, and then the *Pot* with *Earth* be set likewise within the *Ground*, some two or three Inches, the *Roots* will grow greater, than Ordinary. The Cause may be, for that Hauing *Earth* enough within the *Pot* to nourish them; And then being stopped by the Bottom of the *Pot* from putting Strings downward, they must needs grow greater in Breadth, and Thickness. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

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The Cutting off the *Leaues* of *Radish*, or other *Roots*, in the beginning of *Winter*, before they wither; And Couering againe the *Root*, something high with *Earth*; Will preserve the *Root* all *Winter*, and make it bigger, in the *Spring* following, as hath beene partly touched before. So that there is a double Use of this Cutting off the *Leaues*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthening the *Root*, it will make the *Fruit* also the greater.

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It is an Experiment of great pleasure, to make the *Leaues* of *Shady Trees*, larger than ordinary. It hath beene tryed (for certaine) that a *Cions* of a *Weech-Elme*, grafted vpon the Stocke of an Ordinary *Elme*, will put forth *Leaues*, almost as broad as the Brimme of ones Hat. And it is very likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaues*. It would be tryed therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the *Leafe*.

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The Barrennesse of *Trees*, by Accident, (besides the Weaknesse of the *Soile*, *Seed*, or *Root*; And the Injury of the *Weather*) commeth either of their *Over-growing* with *Mosse*, Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaues*. For all these there are Remedies mentioned before.

Experiments
in Confort
touching Com-
pound Fruits
and Flowers.

Wee see that in *Living Creatures*, that haue *Male* and *Female*, there is Copulation of severall Kindes; And so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Ass*; And some other *Compounds*, which we call *Monsters*,

sters, though more rare : And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit* ; commeth, for that the Fountaines of Waters there, being rare, diuers Sorts of Beasts come from seuerall Parts to drinke ; And so being refreshed, fall to couple, and many times with seuerall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out ; Which neuerthelesse, if it be possible, is more at command, than that of *living Creatures* ; For that their Lust requireth a voluntary Motion : wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out : For so you may haue great Varietie of New *Fruits*, and *Flowers* yet vnknowne. *Grafting* doth it not : That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* euer ouer-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of seuerall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come vp in one *Stocke* ; But yet they will put forth their seuerall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnitie* of *Continuance*, is easier to procure, than *Vnitie* of *Species*. It is reported also, that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the vpper Parts being flatted, and bound close together, will put forth *Grapes* of the seuerall Colours, vpon the same Branch ; And *Grape-Stones* of seuerall Colours within the same *Grape* : But the more, after a yeare or two ; The *Vnitie* (as it seemeth) growing more Perfect. And this will likewise helpe, if from the first *Vniting*, they be often Watred ; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke* ; At the least for a time.

They report, that diuers *Seeds*, put into a *Clout*, and laid in Earth well dunded, will put vp *Plants Contiguous* ; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth.

It is reported, that young *Trees* of seuerall kindes, set contiguous, without any binding, and very often Watred, in a *Fruitfull Ground*, with the very Luxurie of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded ; For that the *Binding* doth hinder the Naturall Swelling of the *Tree* ; which, while it is in Motion, doth better *vnite*.

There are many Ancient and Recciued Traditions and Obseruations, touching the *Sympathy* and *Antipathy* of *Plants* :

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For

Experiments
in Consort
touching the
Sympathy and
Antipathy of
Plants.

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For that some will thrive best growing neere others ; which they impute to *Sympathy* : And some worse ; which they impute to *Antipathy*. But these are Idle and Ignorant Conceits ; And forsake the true *Indication* of the *Causes* ; As the most Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any such Secret *Friendship*, or *Hatred*, as they imagine ; And if we should be content to call it *Sympathy*, and *Antipathy*, it is utterly mistaken ; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy* : For it is thus ; Wherefocuer one *Plant* draweth such a particular Iuyce out of the Earth ; as it qualifyeth the Earth ; So as that Iuyce which remaineth is fit for the other *Plant*, there the Neighbourhood doth good ; Because the Nourishments are contrary, or severall : But where two *Plants* draw (much) the same Iuyce, there the Neighbourhood hurteth ; For the one deceiueth the other.

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First therefore, all *Plants* that doe draw much *Nourishment* from the *Earth*, and so soake the *Earth*, and exhaust it ; hurt all Things that grow by them ; As *Great Trees*, (especially *Ashes*,) and such *Trees*, as spread their *Roots*, neere the *Top* of the *Ground*. So the *Colewort* is not an Enemy (though that were anciently receiued) to the *Vine* only ; But it is an Enemy to any other *Plant* ; Because it draweth strongly the fittest Iuyce of the *Earth*. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away ; This may be, because there it findeth worse Nourishment ; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nourisheth.

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Where *Plants* are of severall Natures, and draw severall Iuyces out of the *Earth*, there (as hath beene said) the One set by the other helpeth : As it is set downe by diuers of the Ancients, that *Rew* doth prosper much, and becommeth stronger, if it be set by a *Figge-Tree* : which (we conceiue) is caused, Not by Reason of *Friendship*, but by *Extraction* of a Contrary Iuyce : The one Drawing Iuyce fit to result Sweet, the other bitter. So they haue set downe likewise, that a *Rose* set by *Garlicke* is sweeter : Which likewise may be, because the more Fetide Iuyce of the *Earth* goeth into the *Garlicke* ; And the more Odorate into the *Rose*.

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This wee see manifestly, that there be certaine *Corne-Flowers*, which come seldome or neuer in other places, vnlesse they be set ; But onely amongst *Corne* : As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold*, *Wilde Poppy*, and *Fumitorie*. Neither can this be, by Reason of the Culture of the *Ground*, by Plowing, or Furrowing ; As some *Herbs*, and *Flowers*, will grow but in *Ditches* new Cast ; For if the *Ground* lie fallow, and vnfowne, they will not come : So as it should seeme to be the *Corne*,
that

that qualifieth the Earth, and prepareth it for their Growth.

This Observation, if it holdeth, (as it is very probable,) is of great use, for the *Meliorating* of *Taste* in *Fruits*, and *Esculent Herbs*; And of the *Scent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients haue noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the *Tastes* that doe most offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harsh*; *Sowre*; And *Watrish*, or *Flashy*. It were good therefore to make the *Trials* following.

Take *Wormewood*, or *Rew*, and set it neere *Lettuce*, or *Coleflory*, or *Artichauke*; And see whether the *Lettuce*, or the *Coleflory*, &c. become not the sweeter.

Take a *Servise-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which wee know haue *Fruits* of harsh and binding luyce, and set them neere a *Vine*, or *Figge-Tree*, and see whether the *Grapes*, or *Figs*, will not be the sweeter.

Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Muske-Melons*, and see whether the *Melons* will not be more *Winy*, and better tasted. See *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

Take *Common Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and lesse Earthy in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more Odorate, or Aromaticall.

Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like luyce. And therefore I thinke *Rosemary* will lesse in Sweetnesse, if it be set with *Laurender*, or *Bayes*, or the like. But yet, if you will correct the strength of an Herbe, you shall doe well to set other like Herbs by him, to take him downe; As if you should set *Tansy* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*.

This *Axiome* is of large extent; And therefore would be seuered, and refined by *Triall*. Neither must you expect to haue a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

Triall would be also made in *Herbs Poisonous*, and *Purgatiue*, whose ill Qualitie (perhaps) may be discharged, or attempred, by Setting stronger *Poisons*, or *Purgatiues*, by them.

It is reported, that the *Shrub* called *Our Ladies Scale*, (which is a Kinde of *Briar*,) and *Coleworts*, set neere together, one or both will die. The Cause is, for that they be both great Depredatours of the Earth, and one of them starueth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One de-

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ceiueth the Other. And the like of *Hemlocke* and *Rew*; Both which draw strong Iuyces.

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Some of the Ancients, and likewise diuers of the Moderne Writers, that haue laboured in *Naturall Magicke*, haue noted a *Sympathy*, between the *Sunne*, *Moone*, and some Principall *Starres*; And certaine *Herbs*, and *Plants*. And so they haue denominated some *Herbs Solar*, and some *Lunar*; And such like Toyes put into great Words. It is manifest, that there are some *Flowers*, that haue *Respect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed most *Flowers*, doe open or spread their *Leaues* abroad, when the *Sunne* shineth serene and faire: And againe, (in some part,) close them, or gather them inward, either towards *Night*, or when the *Skie* is ouercast. Of this there needeth no such Solemne Reason to be assigned; As to say, that they reioyce at the presence of the *Sunne*; And mourne at the Absence thereof. For it is Nothing else, but a little Loading of the *Leaues*, and Swelling them at the *Bottom*, with the Moisture of the *Aire*; whereas the drie *Aire* doth extend them: And they make it a Peece of the wonder, that *Garden Clauer* will hide the *Stalke*, when the *Sunne* sheweth bright; Which is Nothing, but a full Expansion of the *leaues*. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart wort*; *Malow Flowers*; and others. The Cause is somewhat more Obscure than the former; But I take it to be no other, but that the Part against which the *Sunne* beateth, waxeth more faint and flaccide in the *Stalke*; And thereby lesse able to support the *Flower*.

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What a little *Moisture* will doe in *Vegetables*, euen though they be dead, and seuered from the *Earth*, appeareth well in the *Experiment* of *Inglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the *Bottom*, and one smooth entire *Straw* at the *Top*. They take only the Part that is Wreathed, and cut off the other, leauing the *Beard* halfe the Breadth of a finger in length. Then they make a little *Crosse* of a *Quill*, long-ways of that Part of the *Quill*, which hath the *Pith*; And *Crosse*-ways of that peece of the *Quill* without *Pith*; The whole *Crosse* being the Breadth of a Finger high. Then they pricke the *Bottom* where the *Pith* is, and therinto they put the *Oaten-beard*, leauing halfe of it sticking forth of the *Quill*: Then they take a little white Box of wood, to deceiue Men, as if somewhat in the Box did worke the *Feat*: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Crosse* sinke downe, but to sticke. Then likewise by way of *Imposture*, they make a *Question*; As, Who is the Fairest Woman in the Company? Or, Who hath a Gloue, or Card? And cause Another to name diuers Persons: And upon euery Naming, they sticke the *Crosse* in the Box, hauing first put it towards their Mouth, as if they charmed it; And the *Crosse* stirreth not; But when they come to the Person that they would take; As they hold the *Crosse* to their Mouth, they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so strike the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the vntwining of the *Beard* by the Moisture. You may see it more euidently, if you strike the *Crosse* betweene your fingers, in Stead of the Box; And therefore you may see, that this Motion, which is effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herb* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, haue a great Dew vpon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the *Sunne*. Men saunour Wonders. It were good first to be sure, that the Dew that is found vpon it, be not the Dew of the Morning Preserued, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Lease, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may be Purslane, or some other *Herb*, doth the like, and is not marked. But if it be so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plums sweate when they are set into the Ouen: for you will not (I hope) thinke, that it is like *Goatsons Fleeces of Wool*, that the Dew should fall vpon that, and no where else.

It is certaine, that the *Honey-dews* are found more vpon *Oake-leaves*, than vpon *Willow*, or *Beech*, or the like: But whether any Cause be, from the Lease it selfe, to concoct the Dew; Or whether it be onely, that the Lease is Close and Smooth: (And therefore drinketh not in the Dew, but preserueth it;) may be doubted. It would be well inquired, whether *Manna* the Drug, doth fall but vpon certaine *Herbs* or *Leaves* onely. *Flowers* that haue deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodvine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the Dew.

The Experience is, that the *Froth*, which they call *Woodseare*, (being like a kinde of Spittle,) is found but vpon certaine *Herbs*, and those Hot Ones; As *Laurender*, *Laurender-cotton*, *Sage*, *Hyslope*, &c. Of the Cause of this enquire further; For it seemeth a Secret. There falleth also *Mildew* vpon *Cornes*, and smutteth it; But it may be, that the same falleth also vpon other *Herbs*, and is not obserued.

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch onely. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canuasse: Fill it with Earth about the Canuasse, and let not the Earth be watred; Then sow some good *Seeds* in that Earth; But vnder the Canuasse, some halfe a foot in the Bottome of the Vessell, lay a great *Sponge*, thorowly wet in water; And let it lye so some ten Dayes; And see

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see whether the *Seeds* will sprout, and the *Earth* become more Moist, and the *Spunge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of *Water*, is far stranger than this.

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touching the
Making Herbs
and Fruits Me-
dicinable.

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The *Altering* of the *Sent*, *Colour*, or *Tasse* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things haue passed their Period, and nourish not. And all *Alteration* of *Vegetables*, in those Qualities, must be by somewhat, that is apt to goe into the Nourishment of the *Plant*. But this is true; that where *Kine* feed vpon *Wilde Garlick*, their *Milke* tasteth plainly of the *Garlick*: And the *Flesh* of *Muttons* is better tasted where the *Sheepe* feed vpon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but vpon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Maiden* that was sed with *Napellus*; (which is counted the Strongest Poyson of all *Vegetables*;) which with vse did not hurt the *Maid*, but poisoned some that had Carnall Company with her. So it is obserued by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the shew alike; But the Vertuous is taken from the Beast, that feedeth vpon the Mountaines, where there are *Theriackall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus far I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempred with diuers Powders, So of *Meat* also, (as *Fleish*, *Fish*, *Milke*, and *Egges*.) that they may be made of great vse for *Medicine*, and *Diet*, if the *Beasts*, *Fowle*, or *Fish*, be sed with a speciall kinde of food fit for the Disease. It were a dangerous Thing also for secret Em-poysonments. But whether it may be applyed vnto *Plants*, and *Herbs*, I doubt more; Because the Nourishment of them is a more common Iuyce; which is hardly capable of any speciall Quality, vntill the *Plant* doe assimilate it.

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But lest our Incredulity may preiudice any profitable Operations in this kind, (especially since Many of the Ancients haue set them down,) We thinke good briefly to propound the foure *Meanes*, which they haue deuised of Making *Plants Medicinable*. The First is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it vp againe. This seemeth to me the least probable; Because the *Root* draweth immediately from the *Earth*; And so the Nourishment is the more Common, and lesse Qualified: And besides, it is a long time in Going vp, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuse* the *Medicine*: Which is somewhat better: For if any Vertue be receiued from the *Medicine*, it hath the lesse way, and the lesse time, to goe vp. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, where-
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in the *Medicine* is *Infused*: Which I haue little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which haue the *Propriety*: But it will be farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watring* of the *Plant* oft, with an *Infusion* of the *Medicine*. This, in one respect, may haue more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receiue those fine *Impressions*; And besides, (as I said before,) they haue a great *Hill* to goe vp. I iudge therefore the likeliest way to be the *Perforation* of the *Body* of the *Tree*, in *seuerall Places*, one above the other; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of those *Lumpes of Dung*, with *Squirts* of an *Infusion* of the *Medicine* in *Dunged water*, once in three or foure Daies,

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VR Experiments we take care to be, (as we haue often said,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Use*, or of *Discovery*: For we hate *Impostures*; And despise *Curiosities*. Yet because we must apply our Selues somewhat to Others, wee will set downe some *Curiosities* touching *Plants*.

It is a *Curiosity*, to haue *seuerall Fruits* vpon *one Tree*; And the more, when some of them come *Earely*, and some come *Late*; So that you may haue, vpon the same *Tree*, *Ripe Fruits* all Sommer. This is easily done, by Grafting of *seuerall Cions*, vpon *seuerall Boughes*, of a Stock, in a good Ground, plentifully fed. So you may haue all *Kindes of Cherries*, and all *kindes of Plums*, and *Peaches*, and *Apricots*, vpon *one Tree*; But I conceiue the *Diuersity* of *Fruits* must be such, as will graft vpon the same Stocke. And therefore I doubt, whether you can haue *Apples*, or *Pearses*, or *Orenge*s, vpon the same Stocke, vpon which you graft *Plummes*.

It is a *Curiosity* to haue *Fruits* of *Diuers Shapes*, and *Figures*. This is easily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may haue *Cucumbers*, &c. as Long

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in Confort,
touching *Curiosities*
about
Fruits and
Plants.

as a Cane; Or as Round as a Spheare; Or formed like a Crosse. You may haue also *Apples*, in the forme of *Peares*, or *Lemons*. You may haue also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must vnderstand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concaue, and so be turned into the *Shape* desired; As it is in Mould-workes of Liquid Things. Some doubt may be conceiued, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Couered. *Quare* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiosity*, to haue *Inscriptions*, or *Engrauings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

———*Tenerisq. meos incidere Amores
Arboribus, crescent illa, crescetis Amores.*

504 You may haue *Trees* apperrelled with *Flowers*, or *Herbs*, by Boring *Holes* in the *Bodies* of them, and Putting into them *Earth* helpen with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would be tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may be, they being of a more Ligneous Nature, will incorporate with the *Tree* it selfe.

505 It is an ordinary *Curiosity*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great *Castles* made of *Trees* vpon Frames of Timber, with *Turrets*, and *Arches*, were anciently matters of Magnificence.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their Preheminence. It is obserued by some, that *Gilly-flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watered, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* consisteth of Scarcity of Nourishment; Except in *Flowers* that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall haue Light, how to induce *Colours*, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Roses*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde also, that *Blossomes* of *Trees*, that are *White*, are commonly *Insipidate*; As *Cherries*, *Pears*, *Plummes*; Whereas those of *Apples*, *Crafs*, *Almonds*, and *Peaches*, are *Blushy*, and *Smell sweet*. The *Cause* is, for that the *Substance* that maketh the *Flower*, is of the *thinnest* and *finest* of the *Plant*; Which also maketh *Flowers* to be of so *dainty Colours*. And if it bee too *Sparing*, and *Thinne*, it attaineth no *Strength* of *Odour*; Except it be in such *Plants*, as are very *Succulent*; Whereby they need rather to be *scanted* in their *Nourishment*, than *replenished*, to haue them *sweet*. As we see in *White Satyrian*, which is of a *Dainty Smell*; And in *Beane-Flowers*, &c. And againe, if the *Plant* be of *Nature*, to put forth *White Flowers*, onely, and those not *thinne*, or *dry*, they are commonly of *rancie* and *fullsome Smell*; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more *Delicate*, and *Sweet* in *Taste*, than the *Coloured*; As wee see in *White Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currants*, &c. The *Cause* is, for that the *Coloured* are more *iuyced*, and *courser iuyced*; And therefore not so well and *equally Concocted*; But the *White* are better *proportioned*, to the *Dissection* of the *Plant*.

But in *Fruits*, the *White* commonly is *meaner*; As in *Peare-Plums*, *Damascins*, &c. And the *Choicest Plummes* are *Blacke*; The *Malberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harue's White-Plumme*, is a *base Plumme*; And the *Verdaccio* and *White Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all *Ouer-watry*: Whereas an higher *Concoction* is required for *Sweetnesse*, or *Pleasure* of *Taste*; And therefore all your *dainty Plummes*, are a little *dry*, and come from the *Stone*; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*; &c. Yet some *Fruits*, which grow not to be *Blacke*, are of the *Nature* of *Berries*, *sweetest* such as are *Paler*; As the *Cœur-Cherry*, which inclineth more to *White*, is *sweeter* than the *Red*; But the *Egriot* is more *lowre*.

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Cloue-Gilly-Flower*, which is the most *Common*;) And sow it; And there will come vp *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with *Nourishment* in the *Earth*; So that the *Gardiners* finde, that they may haue two or three *Roots* amongst an hundred, that are *rare*, and of *great Price*: As *Purple*, *Carnation* of *seuerall Stripes*; The *Cause* is; (no doubt,) that in *Earth*, though it be *contiguous*, and in one *Bed*, there are very *seuerall Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come vp *Purple*, doe alwayes come vp *Single*; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Lease*. This *Experiment* of *seuerall Colours*,

lours, comming vp from one Seed, would be tried also in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyhock*.

§ 11 Few Fruits are coloured Red within; The *Queene-Apple* is; And another *Apple*, called the *Rose-Apple*; *Mulberries* likewise; and *Grapes*, though most toward the Skinne. There is a *Peach* also, that hath a Circle of Red towards the Stone: And the *Egriot-Cherry* is somewhat Red within; But no *Pearre*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they haue (many times) Red sides, are Coloured Red within. The Cause may be enquired.

§ 12 The Generall Colour of Plants is Greene; which is a Colour that no Flower is of. There is a *Greenish Prime-Rose*, but it is Pale, and scarce a Greene; The *Leaves* of some Trees turne a little Murry, or Reddish; And they be commonly Young Leaves that doe so; As it is in *Oakes*, and *Vines*, and *Haste*. Leaves rot into a Yellow; And some *Hollies* haue part of their Leaves Yellow, that are, (to all seeming,) as Fresh and Shining, as the Greene. I suppose also, that Yellow is a lesse Succulent Colour, than Greene; And a d. green nearer White. For it hath beene noted, that those Yellow Leaves of *Holly* stand euer towards the North, or North-East. Some Roots are Yellow, as *Carrets*; And some Plants Bloud-Red, Stalke and Lease, and all; as *Amaranthus*. Some Herbs incline to Purple, and Red; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Rosa Solia*, &c. And some haue White Leaves, as another Kinde of *Sage*, and another Kinde of *Mint*; But Azure, and a Faire Purple, are neuer found in Leaves. This sheweth, that Flowers are made of a Refined Iuyce, of the Earth; And so are Fruits: But Leaves of a more Course, and Common.

§ 13 It is a Curiosity also to make Flowers Double; Which is effected by Often Remouing them into New Earth; As on the contrary Part, Double Flowers, by neglecting, and not Remouing, proue Single. And the Way to doe it speedily, is to sow or set Seeds, or Slips of Flowers; And as soone as they come vp, to remoue them into New Ground, that is good. Enquire also, whether Inoculating of Flowers, (as *Stock-Gilly-Flowers*, *Roses*, *Muske-Roses*, &c.) doth not make them Double. There is a *Cherry-Tree*, that hath Double Blossomes; But that Tree beareth no Fruit; And, it may be, that the same Meanes, which applied to the Tree, doth extremely accelerate the Sap to rise, and breake forth; Would make the Tree spend it selfe in Flowers, and those to become Double; Which were a great pleasure to see; Especially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that haue Blossomes Blush-Coloured.

§ 14 The Making of Fruits, without Core or Stone, is likewise a Curiosity; And somewhat better: Because whatsoeuer maketh them so, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be set in the Ground, haue the Pith finely taken forth, (and not altogether, but some of it left, the better to saue the life,) it will beare a Fruit with little, or no Core, or Stone. And the like is said to be, of diuiding a *Quicke-Tree* downe to the Ground, and Taking out the Pith, and then binding it vp againe.

It is reported also, that a *Citron* grafted vpon a *Quince*, will haue small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted vpon a *Stoeke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells*, or *Seeds*.

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuice* of the *Pith*, from *Rising* in the *Middest*, and *Turning* it to rise on the *Outside*, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some *Affinitie* betweene the *Pith*, and the *Kernell*, because they are both of a harsh Substance, and both placed in the *Middest*.

It is reported, that *Trees* watered perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core*, or *Stone*. And the Rule is generall, that whatsoeuer will make a *Wilde-Tree* a *Garden-Tree*, will make a *Garden-Tree* to haue lesse *Core*, or *Stone*.

The Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Remoued*, maketh them *degenerate*. 2. *Drought*, vnlesse the Earth of it selfe be moist, doth the like. 3. So doth *Remouing into worse Earth*, or *Forbearing to Compost the Earth*; As wee see that *Water-Mint* turneth into *Field-Mint*; And the *Coltsfoot* into *Rape* by Neglect, &c.

Whatsoeuer *Fruit* vseth to bee set vpon a *Root*, or a *Slip*, if it bee *sowne*, will *degenerate*. *Grapes* *sowne*; *Figs*, *Almonds*, *Pomegranate Kernells* *sowne*; make the *Fruits* *degenerate*, and become *Wilde*. And againe, Most of those *Fruits* that vse to be grafted, if they be set of *Kernells*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better vpon *Stones Set*, than vpon *Grafting*: And the Rule of Exception should seeme to be this; That whatsoeuer *Plant* requireth much Moisture, prospereth better vpon the *Stone*, or *Kernell*, than vpon the *Graft*. For the *Stoeke*, though it giueth a finer Nourishment, yet it giueth a scanter, than the Earth at large.

Seeds, if they be very *Old*, and yet haue strength enough to bring forth a *Plant*, make the *Plant* *degenerate*. And therefore skilfull Gardiners maketrial of the *Seeds*, before they buy them, whether they be good or no, by Putting them into Water gently Boyled; And if they be good, they will sprout within Halfe an Houre.

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Thyme*: Although those two *Herbs* seeme to haue small *Affinitie*; but *Basill* is almost the only Hot *Herbe*, that hath Fat and Succulent *Leaues*; Which *Oylineffe*, if it be drawne forth by the *Sunne*, it is like it will make a very great Change.

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *Wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it selfe.

Experiments in Consort touching the Degenerating of Plants; And of the Transmutation of them, one into another.

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It is not impossible, and I haue heard it verified, that vpon *Cutting* downe of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another *Kinde*; As that *Beech* hath put forth *Birch*; Which, if it be true, the *Cause* may be, for that the old *Stub* is too scant of Iuyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

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There is an Opinion in the Countrey, that if the same *Ground* be *sown*, with the *Graine* that grew *upon it*, it will, in the end, grow to be of a baser kinde.

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It is certaine, that in very *Sterile* *Teares*, *Corne* sowne will grow to an *Other Kinde*.

Grandis sæpe quibus mandauimus Hordea Sulcis,

Infelix Lolium, & steriles dominantur Avena.

And generally it is a Rule, that *Plants*, that are brought forth by *Culture*, as *Corne*, will sooner change into other *Species*, than those that come of themselves: For that *Culture* giueth but an *Aduentitious Nature*, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Nature*: For the *Transmutation* of *Species* is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of *Impossibilitie* is to be reiected; And the *Meanes* thereof to be found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Catterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoeuer *Creature*, hauing life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as wee may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therefore *Plants* may well haue a *Transmigration* of *Species*. Wherefore Wanting *Instances*, which doe occurre, wee shall giue *Directions* of the most likely *Trialls*: And generally, wee would not haue those, that read this our Worke of *Sylua Sylvarum*, account it strange, or thinke that it is an Ouer-Haste, that wee haue set downe *Particulars* vntried; For contrariwise, in our owne Estimation, we account such *Particulars*, more worthy, than those that are already

ready tried and knowne. For these Later must be taken as you finde them; But the Other doe leuell Point blanke at the *Inuenting of Causes, and Axiomes.*

First therefore you must make account, that if you will haue one *Plant* change into another, you must haue the *Nourishment* ouer-rule the *Seed*; And therefore you are to practise it by *Nourishments* as contrary, as may be, to the *Nature* of the *Herbs*; So neuerthelesse as the *Herbe* may grow; And likewise with *Seeds* that are of the Weakest Sort, and haue least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them vpon Tops of Hills, and Champaignes; And such *Plants* as require much Moisture, vpon Sandy and very drie Grounds. As for Example, *Marsh-Mallows*, and *Sedge*, vpon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, vpon a Sandy Plot: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, vpon a Wet or *Marsh Ground*. This I conceiue also, that all *Esculent* and *Garden-Herbs*, set vpon the Tops of Hills, will proue more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation of Plants*.

The second Rule shall be to burie some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Iuyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parlsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parlsly-Seed*; Or *Basil-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a litle linnen Cloth, that it mingle not with the forraine *Seed*.

The third Rule shall be, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants* Bruised, or *Shauen*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves*, stamped, and set in it *Artichoakes*, or *Parfnips*; So take *Earth* made with *Maioram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Proesse of Nature still will be, (as I conceiue,) not that the *Herbe* you worke vpon, should draw the Iuyce of the Forraine *Herbe*; (For that Opinion wee haue formerly reiecte;) But that there will be a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*.

The fourth Rule shall be, to marke what *Herbs*, some *Earths* doe put forth of themselves; And to take that *Earth*, and to Pot it, or to *Vessell* it; And in that to set the *Seed* you would change: As for example, take from vnder Walls, or the like, where *Nettles* put forth in abundance, the *Earth* which you shall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seeds* of them; And see what the Euent will be: Or take *Earth*, that you haue prepared to put forth *Mus-*
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romes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-Seed*, or *Lettuce-Seed*; For in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe* grow *Contrary* to his *Nature*; As to make *Ground-Herbes* rise in *Height*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene Strawberry*, vpon Sticks, as you doe *Hops* vpon Poles; And see what the *Euent* will be.

531 The sixth Rule shall be, to make *Plants* grow out of the *Sunne*, or *Open Aire*; For that is a great Mutation in *Nature*; And may induce a Change in the *Seed*: As barrell vp *Earth*, and sow some *Seed* in it, and put it in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of *Cauces*; And Pots with *Seeds* sowne, hanged vp in Wells, some distance from the *Water*, and see what the *Euent* will be.

Experiments
in Confort
touching the
Procreant, and
Louess, and
Artificiall *dwarfing*
of *Trees*.

532

It is certaine, that *Timber-Trees* in *Coppice-Woods*, grow more vp-right, and more free from *Vnder-Boughs*, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* haue a *Naturall Motion*, to get to the *Sunne*; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And *Repletion* euer hindreth *Stature*; Lastly, they are kept warme; And that euer in *Plants* helpeth *Mounting*.

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Trees, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in *Height* without *Side-Boughs*, till they come towards the *Top*. The *Cause* is, partly *Heat*; And partly *Tenuitie* of *Iuyce*; Both which send the *Sap* vpwards. As for *Iuniper*, it is but a *Shrub*, and groweth not bigge enough in *Body*, to maintaine a tall *Tree*.

534

It is reported, that a Good Strong *Canuas*, spread ouer a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde *Roome*.

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Trees are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will be *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

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All *Plants*, that put forth their *Sap* hastily, haue their *Bodies* not proportionable to their *Length*; And therefore they are *Winders*, and *Creeepers*; As *Iuy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse *Vigour* of *Mounting*.

Experiments
in Confort,
touching the

The *Scripture* saith, that *Salomon* wrote a *Naturall History*, from the *Cedar of Libanus*, to the *Mosse* growing vpon the *Wall*:

For

For so the best *Translations* haue it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

*Rudiment of
Plant, and
the beginning
of Plant and
superficial.*

Mosse groweth chiefly vpon *Ridges* of *Houses*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Greene. The Growing vpon *Slopes* is caused, for that *Mosse*, as on the one side it commeth of Moisture and Water, so on the other side the *Water* mult but Slide, and not Stand or Poole. And the Growing vpon *Tiles*, or *Walls*, &c. is caused, for that those dried Earths, hauing not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolute, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little Stalkes, besides the low Thrumme.

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Mosse groweth vpon *Alleyes*, especially such as lye Cold, and vpon the North; As in diuers *Tarrasses*: And againe, if they be much trodden; Or if they were, at the first, grauelled; For wherefoeuer *Plants* are kept downe, the Earth putteth forth *Mosse*.

538

Old Ground, that hath bene long vnbroken vp, gathereth *Mosse*: And therefore Husbandmen vse to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth vpon the same Cause; For that, the more Sparing and Staruing Iuyce of the Earth, insufficient for *Plants*, doth breed *Mosse*.

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Old Trees are more *Mossy*, (farre) than *Young*; For that the Sap is not so francke as to rise all to the Boughes, but tireth by the way, and putteth out *Mosse*.

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Fountaines haue *Mosse* growing vpon the *Ground* about them;

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Muscosi Fontes;

The Cause is, for that the *Fountain's* draine the *Water* from the *Ground* *Adiacent*, and leaue but sufficient Moisture to breed *Mosse*: And besides, the Coldnesse of the *Water* conduceth to the same.

The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Assimilate. And vpon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*.

542

The *Moister Sort* of *Trees* yeeld little *Mosse*; As we see in *Aspes*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath bene giuen, of the francke Putting vp of the *Sap* into the *Boughes*; And partly, for that the *Barkes* of those *Trees*, are more Close and Smooth, than those of *Oakes*, and *Asbes*; Whereby the *Mosse* can the hardlier issue out.

543

In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both vpon *Body* and *Boughes*; Which is caused, partly by the Coldnesse of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get vp, to spread so franckly, as it should doe.

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Wee haue said heretofore, that if *Trees* be *Hide-bound*, they wax lesse Fruitfull, and gather *Mosse*: And that they are holpen by *Hacking*, &c. And therefore by the Reason of Contraries, if *Trees* be bound in with *Cords*, or some Outward *Bands*, they will put forth more *Mosse*: Which (I thinke) happeneth to *Trees* that stand Bleake, and vpon the Cold Winds. It would also be tried, whether, if you couer a *Tree*, somewhat thicke vpon the top, after his Powling, it will not gather more *Mosse*. I thinke also, the *Watring* of *Trees* with Cold *Fountaine-Water*, will make them grow full of *Mosse*.

546

There is a *Mosse* the *Perfumers* haue, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quare* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* sake, being a Thing of Price, I haue set downe the last *Experiments*, how to multiply, and call on *Mosses*.

Next vnto *Mosse*, I will speake of *Mushbromes*; Which are likewise an *Vnperfect Plant*. These *Mushbromes* haue two strange *Properties*; The One, that they yeeld so *Delicious* a *Meat*; The other, that they come vp so *hastily*; As in a *Night*; And yet they are *Vnsowne*. And therefore, such as are Vpstarts in State, they call, in reproch, *Mushbromes*. It must needs bee therefore, that they be made of much *Moisture*; And that *Moisture* Fat, *Grosse*, and yet somewhat *Concocted*. And (indeed) we finde, that *Mushbromes* cause the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Emplayson. And this sheweth, that they are *Windy*; And that *Windinesse* is *Grosse*, and *Swelling*; Not *Sharpe*, or *Griping*. And vpon the same reason *Mushbromes* are a *venereous Meat*.

547

It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the *Moistest* of *Trees*,) cut small, and cast into *Furrowes* well dunged, will cause the Ground to put forth *Mushbromes*, at all *Seasons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leauen* of *Bread*, resolued in *Water*.

548

It is reported, that if a *Hilly-Field*, where the *Stubble* is standing, bee set on *Fire*, in a *Showry Season*, it will put forth great Store of *Mushbromes*.

549

It is reported, that *Harts-Horne*, *Shauen*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth vp *Mushbromes*. And we know *Harts-Horne* is of a *Fat* and *Clammy Substance*: And it may be *Oxe-Horne* would doe the like.

550

It hath beene reported, though it be scarce credible, that *Iuy* hath growne out of a *Stags-Horne*; Which they suppose, did rather come from

from a *Conspiration* of the *Horne* vpon the *Iuy*, than from the *Horne* it selfe. There is not knowne any Subst^{ance} ince, but *Earth*, and the *Proce^{dures}* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Masse*, or *Herby Subst^{ance}*. There may be *Trial* made of some *Seeds*, as that of *Fennel-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Vapereff Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones *Hat*; Which they call a *Toads-Steele*: But it is not *Esulent*; And it groweth (commonly) by a dead *Stub* of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his *Iuyce* from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*.

There is a *Cake*, that groweth vpon the *Side* of a *Dead Tree*, that hath gotten no *Name*, but it is large, and of a *Chestnut Colour*, and hard, and pithy; Whereby it should seeme, that euen *Dead Trees* forget not their *Putting forth*; No more than the *Carc^{asses}* of *Mens Bodies*, that put forth *Haire*, and *Nails*, for a *Time*.

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* vpon the *Breaking*: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to bee good for *Kibes*. Belike it hath a *Corrosiue*, and *Fretting Nature*.

There is an *Herb* called *Iewes-Eare*, that groweth vpon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange *Property*; For in *Warme water*, it swelleth, and openeth extremely. It is not greene, but of a dusky browne Colour. And it is vsed for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to haue a *Mollifying*, and *Len^{ifying}* *Vertue*.

There is a Kinde of *Spongy Excre^{scence}*, which groweth chiefly vpon the *Roots* of the *Laser-Tree*; And sometimes vpon *Cedar*, and other *Trees*. It is very *White*, and *Light*, and *Friable*: Which we call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liu^{er}*: But *Offensiue* to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*.

We finde no *Super-Plant*, that is a *Formed Plant*, but *Misseltoe*. They haue an idle *Tradition*, that there is a *Bird*, called a *Missel-Bird*, that feedeth vpon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her *Excrement*: which falling vpon a *Bough* of a *Tree*, that hath some *Rift*, putteth forth the *Misseltoe*. But this is a *Fable*: For it is not probable, that *Birds* should feed vpon that they cannot digest. But allow that, yet it cannot be for other *Reasons*: For *First*, it is found but vpon certaine *Trees*; And these *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed vpon them. It may be, that *Bird* feedeth vpon the *Misseltoe-Ferries*, and so is often found there; Which may haue giuen occasion to the *Tale*. But that which maketh an *End* of the *Que^{stion}*,

tion, is, that *Misseltow* hath beene found to put forth vnder the *Boughes*, and not (onely) about the *Boughes*: So it cannot be any Thing that fil-
leth vpon the *Bough*. *Misseltow* groweth chiefly vpon *Crab-Trees*, *Apple-Trees*, sometimes vpon *Hassles*; And rarely vpon *Oakes*; The *Misseltow* whereof is counted very *Medicinall*. It is euer greene, Winter and Summer; And beareth a *White Glistering Berry*: And it is a *Plant*, vtterly differing from the *Plant*, vpon which it groweth. Two things therfore may be certainly set downe: First, that *Super-faciation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth exerce, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Viscuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammy; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

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This *Experiment* of *Misseltow* may giue Light to other Practises. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound euery Day, with *Warme Water Dunged*, to see if it would bring forth *Misseltow*, or any such like Thing. But it were yet more likely to try it, with some other *Watring*, or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558

It were good to try, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes*: Poll therefore a *Tree*, and couer it, some thicknesse, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay*: Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Try it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

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A Man may count the *Prickles* of *Trees* to be a kinde of *Excrecence*; For they will neuer be *Boughes*, nor beare *Leaves*. The *Plants* that haue *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berberie*; These haue it in the *Bough*, The *Plants* that haue *Prickles* in the *Leafe*, are; *Holly*; *Juniper*; *Whin-bush*; *Thistle*; *Nettles* also haue a small Venemous *Prickle*; So hath *Borrage*, but harmelesse. The Cause must be *Hasty Putting forth*; *Want* of *Moisture*; And the *Closenesse* of the *Barke*; For the *Haste* of the *Spirit* to put forth, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closenesse* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are euer like a *Pyramis*, for that the *Moisture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therefore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but neuer *Plaine*, but as it were with *Folds*, for the same Cause.

There

There be also *Plants*, that though they haue no *Prickles*, yet they haue a Kinde of *Dawny* or *Feluet Rine*, vpon their *Leaues*; As *Rose-Campions*, *Steele-Gilly-Flowers*, *Coles-Root*; which *Dawne* or *Nay* commeth of a *Subtil Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Steele-Gilly-Flowers*, and *Rose-Campions*, stamped, haue beene applied, with *succelle*, to the *Wraists* of those that haue had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Coles-Root* hath a *Sanatiue* vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgery*.

Another Kinde of *Excrecence* is an *Exudation* of *Plants*, ioyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly vpon the *Leaues* of *Oakes*; And the like vpon *Willowes*: And *Countrey People* haue a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *Wormes*, it is a *Signe* of a *Pestilent Yeare*; Which is a likely Thing, because they grow of *Corruption*.

There is also vpon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Masse*, of diuers Colours; Which if you cut, you shall euer finde full of little white *Wormes*.

It is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth *Sundry* Kindes of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*.

The *Nature* of the *Plants* growing out of *Earth* so taken vp, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and *Fine*, it putteth forth *Soft Herbs*; As *Grasse*, *Plantaine*, and the like; If the *Earth* be *Harder* and *Courser*, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c.

It is *Common Experience*, that where *Alleyes* are close *Grauelled*, the *Earth* putteth forth, the first yeare, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Grauell*, or *Pebble* at the first *Laying*, will not suffer the *Grasse* to come forth vpright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the *Top*, the *Ordinary Grasse* commeth vp.

It is reported, that *Earth*, being taken out of *Shady* and *Wet Woods*, some depth, and Potted, will put forth *Herbs* of a *Fat* and *Luicy Substance*; As *Penny-wort*, *Purslane*, *Houfleeke*, *Penny-royall*, &c.

The *Water* also doth send forth *Plants*, that haue no *Roots* fixed in the *Bottom*; But they are lesse *Perfect Plants*, being almost but *Leaues*, and those *Small ones*: Such is that we call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher *Greene*, and putteth forth a little *String* into the *Water*, farre from the *Bottom*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so haue a *Number* of other *Herbs* that grow in *Ponds*.

It is reported by some of the *Ancients*, and some *Moderne Testimony* likewise, that there be some *Plants*, that grow vpon the *Top* of the *Sea*; Being

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in Consort,
touching the
Producing of
Perfect Plants
without Seed.

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Being supposed to grow of some *Concretion* of *Slime* from the *Water*, where the *Sunne* beateh hot, and where the *Sea* stirreth little. As for *Alga Marina*, (*Sea-weed*), and *Eryngium* (*Sea-Thistle*), both haue *Roots*; but the *Sea-weed* vnder the *Water*, the *Sea-Thistle* but vpon the *Shore*.

569

The *Ancients* haue noted, that there are some *Herbs*, that grow out of *Snow*, laid vp close together, and *Putrified*; And that they are all *Bitter*; And they name one specially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not vnlike, that it may likewise put forth *Plants*.

570

The *Ancients* haue affirmed, that there are some *Herbs*, that grow out of *Stone*; Which may be, for that it is certain, that *Toads* haue been found in the Middle of a *Free-Stone*. We see also, that *Flints*, lying about *Ground*, gather *Mosse*; And *Wall-Flowers*, and some other *Flowers*, grow vpon *Walls*; But whether vpon the *Maine Bricke*, or *Stone*, or whether out of the *Lime*, or *Chinckes*, is not well obserued; For *Elders* and *Ashes* haue beene scene to grow out of *Steeple*: But they manifestly grow out of *Clefts*; In so much as when they grow big, they will disioyne the *Stone*. And besides it is doubtfull, whether the *Mortar* it selfe putteth it forth, or whether some *Seeds* be not let fall by *Birds*. There be likewise *Rock-Herbs*; But I suppose those are, where there is some *Mould*, or *Earth*. It hath likewise beene found, that great *Trees* growing vpon *Quarries*, haue put downe their *Root* into the *Stone*.

571

In some *Mines* in *Germany*, as is reported, there grow in the *Bottom* *Vegetables*; And the *Work-Felkes* vie to say, they haue *Magickall Vertue*; And will not suffer *Men* to gather them;

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The *Sea-Sands* seldome beare *Plants*. Whereof the *Cause* is yeelded, by some of the *Ancients*, for that the *Sunne* exhaleth the *Moisture*, before it can incorporate with the *Earth*, and yeeld a *Nourishment* for the *Plant*. And it is affirmed also, that *Sand* hath (alwayes) his *Root* in *Clay*; And that there be no *Veines* of *Sand*, any great depth within the *Earth*.

573

It is certaine, that some *Plants* put forth for a time, of their owne *Store*, without any *Nourishment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide the Experiments 29*.

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in Confort
withing For-
a ne Plants.

574

It is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballast* of *Ships*, cast vpon some *Grounds* in *Italy*, did put forth *Ferraine Herbs*, to vs in *Europe* not knowne; And, that which is more, that of their *Foots*, *Barkes*, and *Seeds*, continued together, and mingled with other *Earth*, and well Warred with *Warne Water*, there came forth *Herbs*, much like the Other.

575

Plants brought out of *Hot Countries*, will endeavour to put forth, at the same *Time*, that they vsual'y do in their owne *Climate*; And therefore to preserve them, there is no more required, than to keepe them from the *Iniury* of Putting backe by *Cold*. It is reported also, that *Graine* out
of

of the *Hotter Countries* translated into the *Colder*, will be more forward, than the Ordinary Graine of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annually*; And so the *Fortue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embased by the *Ground*, to which it is Remoued.

Many *Plants*, which grow in the *Hotter Countries*; being set in the *Colder*, will neuertheless, even in those *Cold Countries*, being sowne of *Seeds* late in the *Spring*, come vp and abide most Part of the *Summer*; As we finde it in *Orange*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowne in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Cloue-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be sowne, would doe the like.

There be some *Flowers*, *Blossomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the *Yeare*. The *Flowers* that come early, with vs, are; *Prime-Roses*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and some early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it should seeme,) haue a quicker *Perception*, of the *Heat* of the *Sunne* Increasing, than the *Hot Herbs* haue; As a *Cold Hand* will sooner finde a little *Warmth*, than a *Hot*. And those that come next after, are *Wall-Flowers*, *Cowslips*, *Hyacinths*, *Rose-mary-Flowers*, &c. And after them, *Pincks*, *Roses*, *Flowerdeluices*, &c. And the latest are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earliest *Blossomes* are, the *Blossomes* of *Peaches*, *Almonds*, *Cornelians*, *Mezerians*, &c. And they are of such *Trees*, as haue much *Moisture*, either *Watric*, or *Oylie*. And therefore *Crocus Vernus* also, being an *Herbe*, that hath an *Oylie Iuyce*, putteth forth early. For those also finde the *Sunne* sooner than the *Drier Trees*. The *Graines* are, first *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Pease* and *Beanes*. For though *Greene Pease* and *Beanes* be eaten sooner, yet the *Drie Ones*, that are vsed for *Horse-Meat*, are ripe last; And it seemeth that the *Fatter Graine* commeth first. The Earliest *Fruits* are, *Strawberries*, *Cherries*, *Gooseberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Rasps*; And after them *Damasins*, and most Kinde of *Plums*, *Peaches*, &c. And the latest are *Apples*, *Wardons*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Hiepe*, *Medlars*, *Seruiues*, *Cornelians*, &c.

It is to be noted, that (commonly) *Trees* that ripen latest, blossome soonest: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it seemeth to be a *Worke of Prouidence*, that they blossome so soone; For otherwise, they could not haue the *Sunne* long enough to ripen.

There be *Fruits*, (but rarely,) that come twice a *Yeare*; as some *Peares*, *Strawberries*, &c. And it seemeth they are such, as abound with *Nourishment*; Whereby after one *Period*, before the *Sunne* waxeth too weake, they can endure another. The *Violet* also, amongst *Flowers*, commeth twice a *Yeare*; Especially the *Double White*; And that also

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in Confort,
touching the
Seasons in
which Plants
come forth.

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is a *Plant* full of Moisture. *Roses* cometwice, but it is not without *Cutting*, as hath beene formerly said.

580

In *Musconia*, though the *Corne* come not vp, till late *Spring*, yet their *Haruest* is as Early as Ours. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with vs, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *Winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall haue *Red Roses*, and *Damask Roses*, come together; And likewise the *Haruest* of *Wheat* and *Barley*. But this happeneth euer, for that the Earlier staith for the Later; And not that the Later commeth sooner.

581

There be diuers *Fruit-Trees*, in the *Hot Countries*, which haue *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the *Yeare*, succeeding one another. And it is said, the *Orange* hath the like with vs, for a great Part of Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to haue so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the *Winter*: And therefore this *Circle of Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582

Some *Herbs* are but *Annuall*, and die, *Root* and all, once a *Yeare*; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basil*, *Tobacco*, *Mustard-Seed*, and all kinde of *Corne*; Some continue many *Yeares*; As *Hyssope*, *Germander*, *Lanander*, *Fennell*, &c. The *Cause* of the *Dying* is double; The first is the *Tendernesse* and *Weaknesse* of the *Seed*, which maketh the *Period* in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are *Hot*. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basil*, *Tobacco*, *Mustard-Seed*. And these haue (all) much *Heat*.

Experiments
in Consort
touching the
Lasting of Herbs
and Trees.

583

The *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest-Nut*, the *Lost-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrary; For *Borage*, *Colewort*, *Pomprions*, which are *Herbs* of the *Largest Size*, are of small *Durance*; Whereas *Hyssope*, *Winter-Sanoury*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munit by their *Barke* against the *Injuries* of the *Aire*: But *Herbs* draw a *Weake Iuyce*; And haue a *Soft Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Sticky Stalke*.

584

Trees that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chestnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Pears*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oyline* of the *Sap*; Which euer wasteth lesse, than the more *Watry*.

585

Trees, that bring forth their *Leaues* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their *Leaues* Early, or shed

fixed the Necessities. The Cause is, for that the late *Comming forth* sheweth a *Misfortune* are fixed; And the other more loose, and more easily resolved. And the same Cause is, that *Wilde Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is Acide, more than those whose *Fruit* is sweet.

Nothing procureth the *Lasting* of *Trees, Busses, and Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a Renouation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: In so much as *Annually Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come vp still young, will last more Yeares than one; As hath beene partly touched; Such as *Lettuce, Parslaine, Cucumber*, and the like. And for *Great Trees*, we see almost all *Over-grownne Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dastards*, and not *Trees* at their full Height.

Some Experiment would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinary Period; As to make a *Stalke* of *Wheat*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoeuer maketh the *Herbe* come later, than at his time, will make it last longer time: It were good to try it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a *Case* of *Wood*, not touching the *Straw*, to keepe out *Open Aire*.

As for the Preservation of *Fruits, and Plants, as well upon the Tree, or Stalke, as gathered, we shall handle it under the Title* of *Conseruation of Bodies*,

The *Particular Figures* of *Plants* we leaue to their *Descriptions*; But some few Things, in generall, we will obserue. *Trees and Herbs*, in the Growing forth of their *Boughes*, and *Branches*, are not *Figured*, and keep no Order. The Cause is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalkes* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees, Warden-Trees, Quince-Trees, Medlar-Trees, Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Pearre Tree*, (which the *Criticke*s will haue to borrow his name of *us*, *Fire*,) *Orange-Trees, Firre-Trees, Service-Trees, Lime-Trees*, &c. And some are more sored and broad; As *Beeches, Hornebeame*, &c. The rest are more indifferent. The Cause of Scattering the *Boughes*, is the *Hasty* breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The Cause of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

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in Consort
touching the
seuerall Figures
of Plants.

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Spreading is caused by the *Carrying* vp of the *Sap*, plentifully, without Expençe; And then putting it forth speedily, and at once.

589

There be diuers *Herbs*, but no *Trees*, that may be said to haue some kinde of Order, in the Putting forth of their *Leaves*: For they haue *Joyns*, or *Knuckles*, as it were Stops in their *Germination*; As haue *Gilly-Flowers*, *Pinkes*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The Cause whereof is, for that the *Sap* ascendeth vnequally, and doth (as it were) tire and stop by the way. And it seemeth, they haue some *Closeness*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going vp, vntill it hath gathered into a Knot, and so is more vrged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalke*, *Stubble*, and *Canes*.

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Flowers haue (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Four*; As in *Prime-Roses*, *Brier-Roses*, *Single Muske-Roses*, *Single Pinkes*, and *Gilly-Flowers*, &c. which haue five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Buglosse*, &c. which haue foure *Leaves*. But some put forth *Leaves* not Numbred; But they are euer small Ones; As *Mary-Golds*, *Trifoile*, &c. We see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the *Five Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round, Some Long; None Square; And many iagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Jagging* of *Pinkes*, and *Gilly-Flowers*, to be like the Inequality of *Oake-leaves*, or *Fine-leaves*, or the like; But they seldome or neuer haue any small *Purles*.

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in Confort,
touching some
Principall Differences
in Plants.

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Of *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Pearres*, *Plums*, *Cherries*, *White-Thorne*, &c. The Cause is, for that those, that put forth their *Blossomes* first, haue either an *Acute* and *Sharpe Spirit*; (And therefore commonly they all put forth earely in the Spring, and ripen very late; As most of the Particulars before mentioned;) Or else an *Oily Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

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Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Iuy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The Cause of the Holding *Greene*, is the Close and Compact Substance of their *Leaves*, and the *Pedicles* of them. And the Cause of that againe, is either the *Tough* and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous* a *Iuyce*, as they make *Bird-lime* of the Barke of it. The *Stalke* of *Iuy* is *Tough*, and not *Fragile*, as we see in other small *Twigs* dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavy *Wood*, as we see it in *Bowles*. *Eugh* is a Strong and *Tough Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewise a Hot and Aromaticall *Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their Density appeareth, in that, either they are Smooth and

and Shining, as in *Bayes, Holly, Ivy, Box, &c.* Or in that they are Hard and Sp. ry, as in the rest. And Triall would be made of *Grafting* of *Rose-Mary, and Bayes, and Box, ypon a Holly-Stacke*; Because they are *Plants* that come all *Winter*. It were good to try it also with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To see whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; because the *Sap*, of the *Holly* putteth forth most in the *Winter*. It may be also a *Mezerion-Tree*, grafted ypon a *Holly*, will proue both an *Earlier*, and a *Greater Tree*.

There be some *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be some, that beare *Flowers*, and no *Fruit*: There be some that beare neither *Flowers*, nor *Fruit*. Most of the great *Timber-Trees*, (as *Oakes, Beeches, &c.*) beare no apparent *Flowers*: Some few (likewise) of the *Fruit-Trees*; As *Mulberry, Wall-nut, &c.* And some *Shrubs*, (as *Juniper, Holly, &c.*) beare no *Flowers*. Divers *Herbs* also beare *Seeds*, (which is as the *Fruit*), and yet beare no *Flowers*; As *Purslane, &c.* Those that beare *Flowers* and no *Fruit*, are few; As the *Double Cherry*, the *Sallow, &c.* But for the *Cherry*, it is doubtfull, whether it be not by *Art*, or *Culture*; For if it be by *Art*, then *Triall* would be made, whether *Apples*, and other *Fruits Blossomes*, may not be doubled. There are some Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars, Box, Brakes, &c.*

There be some *Plants*, that shoot still upwards, and can support themselves; As the greatest Part of *Trees* and *Plants*: There be some Other, that Creepe along the *Ground*; Or *Winde* about other *Trees*, or *Propps*, and cannot support themselves; As *Vines, Ivy, Briar, Bryony, Wood-bines, Hops, Climatis, Camomill, &c.* The Cause is, (as hath beene partly touched,) for that all *Plants*, (naturally) moue upwards; But if the *Sap* put vp too fast, it maketh a slender *Stalke*, which will not support the weight: And therefore these latter Sort are all Swift and Hasty *Commers*.

The first and most Ordinary *Helpe* is *Stercoration*. The *Sheeps Dung* is one of the best; And next, the *Dung* of *Kine*: And thirdly, that of *Horses*: Which is held to be somewhat too hot, vlesse it be mingled. That of *Pigeons* for a *Garden*, or a small *Quantity* of *Ground*, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to spread it immediately before the *Ploughing* and *Sowing*; And so to *Plough* it in: For if you spread it long before, the *Sunne* will draw out much of the *Fertnesse* of the *Dung*: If the *Ground* be *Grasing Ground*, to spread it somewhat late, towards *Winter*; That the *Sunne* may haue the lesse *Power* to dry it vp. As for speciall *Composts* for *Gardens*, (as a *Hot Bed, &c.*) we haue handled them before.

The Second *Kind* of *Compost*, is, the *Spreading* of diuers *Kinds* of *Earths*, As *Marle, Chalke, Sea-Sand, Earth ypon Earth, Pond Earth*; And the *Mixtures* of them. *Marle* is thought to be the best; As hauing most *Fertnesse*;

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Hee of Ground.

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And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalke* ouer-heateth the *Ground* a little. And therefore is best vpon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalke* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: But that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to try the laying of *Chalke* vpon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Cōpasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred vpon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is euer the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I cōceiue, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Houell, thatched, ouer some Quantity of *Ground*; Nay if you doe but Plancke the *Ground* ouer, it will breed *Salt-petre*. As for *Pond-Earth*, or *Riuer Earth*, it is a very good *Compost*; Especially if the *Pond* haue beene long vncleansed, and so the *Water* be not too Hungry: And I iudge it will be yet better, if there be some *Mixture* of *Chalke*.

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The Third Helpe of *Ground*, is, by some other *Substances*, that haue a Vertue to make *Ground* Fertile; though they be not meere *Earth*: wherein *Asbes* excell; In so much as the Countries about *Aetna*, and *Vesunius*, haue a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnessse* of the Soyle, caused by the *Asbes*, scattered about. *Soot* also, though thinnely spread, in a *Field*, or *Garden*, is tried to be a very good *Compost*. For *Salt*, it is too Costly: But it is tryed, that mingled with *Seed-Corne*, and sown together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all ouer. As for the *Steeping* of the *Seeds*, in seuerall *Mixtures* with *Water*, to giue them Vigour; Or *Watring Grounds* with *Compost-Water*; We haue spoken of them before.

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The Fourth Helpe of *Ground*, is, the *Suffering* of *Vegetables* to dye into the *Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast vpon the *Ground*, in the Beginning of *Winter*, will make it very Fruitfull. It were good (also) to try, whether *Leanes* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to giue them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leanes* of *Trees*; And as they lye scattered, and without Mixture, they rather make the *Ground* soure, than otherwise.

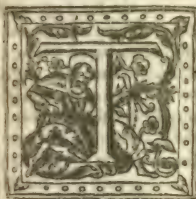
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The Fifth *Helpe* of *Ground*, is *Heat* and *Warmth*. It hath beene anciently practised to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *Wind*, vpon the *Ground*: Wee see, that *Warmth* of *Walls* and *Enclosures*, mendeth *Ground*: Wee see also that *Lying open* to the *South*, mendeth *Ground*: Wee see againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *Compost*: And it may be doubted, whether the *Couering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof we spake in the last *Experiment*,) helpeth it not, by reason of the *Warmth*. Nay some very good *Husbands* doe suspect, that the *Gathering* vp of *Flints*, in *Flinty Ground*, and Laying them on *Hesperes*, (which is much vsed,) is no good *Husbandry*; For that they would keep the *Ground* warme.

The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting out Waters*, at reasonable Times: For *Water*, at some Seasons, and with reasonable stay, doth good; But at some other Seasons, and with too long Stay, doth hurt. And this serueth onely for *Meadomes*, which are along some *Riuer*. The other way is, to bring *Water*, from some *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in some long *Furrowes*; And from those *Furrowes*, drawing it trauerse to spread the *Water*. And this maketh an excellent Improvement, both for *Corne*, and *Grasse*. It is the richer, if those *Hanging Grounds* be fruitfull, because it washeth off some of the Fatnesse of the *Earth*: But howsoeuer it profiteth much. Generally, where there are great Ouerflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cause* may be, for that it keepeth the *Ground* warme, and nourisheth it: But the *Fen-Men* hold, that the *Sewers* must be kept so, as the *Water* may not stay too long in the *Spring*, til the *Weeds* and *Sedge* be growne vp; For then the *Ground* will be like a *Wood*, which keepeth out the *Sunne*; And so continueth the *Wet*; Whereby it will neuer graze (to purpose) that yeare. Thus much for *Irrigation*. But for *Auoydances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee shall speake of them in another Place.

NATVRALL HISTORIE.

VII. Century.



THe Differences betweene *Animate* and *Inanimate Bodies*, we shall handle fully vnder the Title of *Life*; and *Living Spirits*, and *Powers*. We shall therefore make but a brieue Mention of them in this Place. The Main Difference are two. All Bodies haue *Spirits*, and *Pneumaticall Parts* within them: But the Main Differences betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all Continued with themselves, and are Branched in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* haue not only Branches, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The Second Main Difference is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed: And haue a fine Commixture of *Flame*, and an *Aeriall Substance*. But *Inanimate Bodies* haue their *Spirits* no whit Inflamed, or Kindled. And this Difference consisteth not in the Heat or Coolenesse of *Spirits*; For *Cloues* and other *Spices*, *Naphtha* and *Petroleum*, haue exceeding Hot *Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not Inflamed. And when any of those Weake and Temperate *Bodies* come

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tweene *Plants*
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to

to be Inflamed, then they gather a much greater *Heat*, than others haue *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

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The *Differences*, which are *Secondary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to *Spread* and *Continue* it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They haue an *Accretion*, but no *Alimentation*. Thirdly, *Plants* haue a *Period of Life*; which *Inanimate Bodies* haue not. Fourthly, they haue a *Succession*, and *Propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

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The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold *Inanimate*), are these: First, *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part about *Earth*, and part vnder *Earth*.

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There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Nearest of both *Kindes*: Another is *Vitrioll*, for that is aptest to sprout with *Moisture*.

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Another speciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it dissolue not in *Arefaction*) will in the end issue into *Plants*, or *Liuing Creatures* bred of *Putrefaction*. I account *Mosse*, and *Mushromes*, and *Agaricke*, and other of those *kindes*, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Flesh*, and *Fish*, and *Plants* themselves, and a Number of other things, after a *Mouldingesse*, or *Rottenesse*, or *Corrupting*, they will fall to breed *Wormes*. These *Putrefactions*, which haue *Affinitie* with *Plants*, haue this *Difference* from them; That they haue no *Succession* or *Propagation*, though they *Nourish*, and haue a *Period of Life*, and haue likewise some *Figure*.

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I left once, by chance, a *Cutren* cut, in a close Roome, for three Summer-Moneths, that I was absent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke *Heads*, as if they would haue beene some *Herbe*.

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Plants, and *Li-
uing Creatures*:
And the *Confi-
rners* and *Parti-
cles* of them.

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The *Affinities* and *Differences* betweene *Plants* and *Liuing Creatures*, are these that follow. They haue both of them *Spirits Continued*, and *Branched*, and also *Inflamed*: But first in *Liuing Creatures*, the *Spirits* haue a *Cell* or *Seat*, which *Plants* haue not; As was also formerly said: And secondly, the *Spirits* of *Liuing Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And these two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Vn hereas all *Liuing Creatures* are seuered, and of themselves. Secondly, *Liuing Creatures* haue *Locall Motion*; *Plants* haue not. Thirdly, *Liuing Creatures* nourish from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nourish from below, namely from the *Roots*. Fourthly, *Plants* haue their *Seed* and *Seminall Parts* vppermost; *Liuing Creatures* haue

have them lower-most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inuersa; Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* haue a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* haue more *Diversity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* haue. Seuenthly, *Living Creatures* haue *Sense*, which *Plants* haue not. Eighthly, *Living Creatures* haue *Voluntary Motion*, which *Plants* haue not.

For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hec-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The nearest Approach of it, is between the *Hec-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the One to the other: In so much as, (that which is more strange,) they doubt not to report, that to keepe the *Trees* vpright from *Bending*, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enioyed by the *Contact* of a *Middle Body*. But this may be *Figned*, or at least *Amplified*. Neuerthel'sse, I am apt enough to thinke, that this same *Binarium* of a *Stronger* and a *Weaker*, like vnto *Ma'culine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: And it is doubled so netimes; As in *Hermaphrodites*: But generally there is a *Degree* of *Strength* in most *Species*.

The *Particples* or *Confiners* betweene *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and haue no *Local Motion* of *Remoue*, though they haue a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a *Fabulous Narration*, that in the *Northerne Countries* there should be an *Herbe* that groweth in the *kenesse* of a *Lambe*, and feedeth vpon the *Grasse*, in such sort, as it will bare the *Grasse* round about. But I suppose, that the *Figure* maketh the *Fable*; For so we see, there be *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, hauing a great *Stalke* in the *Top*, doth prey vpon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it.

The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *Wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softnesse* of the *Stalke*, which maketh the *Bough*, being overladen, and not stiffely vpheld, weigh downe. It hath *Leaues*, as broad as a little *Target*, but the *Fruit* no bigger than *Beemes*. The *Cause* is, for that the *Continuall* *Shade* increaseth the *Leaues*, and abateth the *Fruit*; which neuerthel'sse is of a pleasant Taste. And that (no doubt) is caused, by the *Supplenesse* and *Gentlenesse* of the *Iuyce* of that *Plant*, being that which maketh the *Boughes* also so *Flexible*.

It is reported by one of the *Ancients*, that there is a certaine *Indian Tree*,

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Tree, hauing few, but very great, *Leaues*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that poure out the *Sap* so fast, as they haue no leisure, either to diuide into many *Leaues*, or to put forth *Stalks* to the *Fruit*. With vs *Trees* (generally) haue small *Leaues*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaues* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The Cause is, (like to that of the *Indian Fig*.) the hasty and plentifull Putting forth of the *Sap*.

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There be three *Things* in vse for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little vsed. It is found in *Canes*: *Quare*, whether to the first *Knuckle*, or further vp? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I haue heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that he hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a fortnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported also by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleys of *Hircania*, that distilleth *Honey* in the *Mornings*. It is not vnlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may be also, that some sweet Iuyces, fit for many vses, may be concocted out of *Fruits*, to the Thickness of *Honey*, or perhaps of *Sugar*; The likeliest are *Raisins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

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The *Ancients* report of a *Tree*, by the *Persian Sea*, vpon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebberth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*;) & grasping the *Sands* like a *Crab*; Which neuertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

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There be of *Plants*, which they vse for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth aboue.

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They haue, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There be *Sleepers* enow then; For almost all *Flowers* doe the like.

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Some *Plants* there are, but rare, that haue a *Mossy* or *Downy Root*; And likewise that haue a Number of *Threds*, like *Beards*; As *Mandrakes*; wherof *Witches* and *Impossours* make an vgly *Image*, giuing it the Forme of a *Fide* at the *Top* of the *Root*, and leaue those *Strings* to make a broad *Beard* downe to the *Foot*. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Denes* foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betwene both; That besides the Putting forth vpwards, and downwards, putteth forth in Round.

There are some *Teares of Trees*, which are kembed from the *Beards of Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth vpon their *Beards*: Of this Sort is some kinde of *Ladanum*.

The *Irrigation of the Plaine-Tree by Wine*, is reported by the *Ancients*, to make it Fruitfull. It would be tried likewise with *Roots*; For vpon *Seeds* it worketh no great Effects.

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate.

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrue: Neither did it loue the Sunne: There might be one Cause of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quere* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things.

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins of Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe deuoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter.

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than we know any; For there haue beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they vse for *Wine*, are so often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increasc much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twiggcs*, while they are greene, so brittle, yet the *Wood* dryed is extreme Tough; And was vsed by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*.

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading vpon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that vse to be borne vp by Props, will not put forth greater *Leaues*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c.

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will giue them a Taste Quer-

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luthious, it were good to make Triall in Powder of Sugar; Or in Syrrup of Wine onely Boyled to Height. Both these would likewise be tried in Oranges, Limons, and Pomegranats; For the Powder of Sugar, and Syrrup of Wine, will serue for more times than once.

625 The Conseruation of Fruit would be also tried in Vessells, filled with fine Sand, or with Powder of Chalke; Or in Meale and Flower; Or in Dust of Oake-wood; Or in Mill.

626 Such Fruits, as you appoint for Long Keeping, you must gather before they be full Ripe; And in a Faire and Dry Day, towards Noone; And when the Wind bloweth not South; And when the Moone is vnder the Earth; And in Decrease.

627 Take Grapes, and hang them in an Empty Vessell, well Stopped; And set the Vessell, not in a Cellar, but in some dry Place; And it is said, they will last long. But it is reported by some, they will keepe better, in a Vessell halfe full of Wine, so that the Grapes touch not the Wine.

628 It is reported, that the Preseruing of the Stalke, helpeth to preserue the Grape; Especially if the Stalke be put into the Pith of Elder, the Elder not touching the Fruit.

629 It is reported by some of the Ancients, that Fruit put in Bottles, and the Bottles let downe into Wells vnder Water, will keepe long.

630 Of Herbs and Plants, some are good to eat Raw; As Lettuce, Endiue, Purslane, Tarragon, Cresses, Cucumbers, Muske-Melons, Radish, &c. Others onely after they are Boyled, or haue Passed the Fire; As Parsley, Clary, Sage, Parsnips, Turnips, Asparagus, Artichokes, (though they also being young are eaten Raw:) But a Number of Herbs are not Esculent at all; As Worme-wood, Grasse, Greene-Corne, Centory, Hyssope, Laurelder, Balme, &c. The Causes are, for that the Herbs, that are not Esculent, do want the two Tastes, in which Nourishment resteth; Which are, Fat, and Sweet; And haue (contrariwise) Bitter and Over-strong Tastes, or a Iuyce so Crude, as cannot be ripened to the degree of Nourishment. Herbes and Plants, that are Esculent Raw, haue Fatnesse, or Sweetnesse, (as all Esculent Fruits;) Such are Onions, Lettuce, &c. But then it must be such a Fatnesse, (for as for Sweet Things, they are in effect alwayes Esculent,) as is not Over-grosse, and Loading of the Stomach; For Parsnips and Leeks haue Fatnesse; But it is too Grosse and Heavy without Boiling. It must be also in a Substance somewhat Tender; For we see Wheat, Barley, Artichokes, are no good Nourishment, till they haue Passed the Fire; But the Fire doth ripen, and maketh them soft and tender, and so they become Esculent. As for Radish, and Tarragon, and the like, they are for Condiments, and not for Nourishment. And euen some of those Herbes, which are not Esculent, are notwithstanding Poculent; As Hop's, Broome, &c. Quere what Herbs are good for Drinke, besides the two aforementioned; For that it may (perhaps) ease the Charge of Brewing, if they make Beere to require lesse Malt, or make it last longer.

631 Parts fit for the Nourishment of Man, in Plants, are, Seeds, Roots, and Fruits; But chiefly Seeds, and Roots. For Leauues, they giue no Nourishment,

ment, at all, in very little: No more doe *Flowers*, or *Flaſſames*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oily* and *Watry* Substance commixed,) haue more of the *Oily* Substance; And *Leaues*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concealed*; For the *Root*, which continueth euer in the *Earth*, is still *Concealed* by the *Earth*; And *Fruits*, and *Graines*, (we see) are halfe a yeare, or more, in *Concealing*; Whereas *Leaues* are out, and Perfect in a Moneth.

Plants (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe* and *Root*. The Cause is, for that in *Plants*, that are not of a Fierce and Eager Spirit, the Vertue is increased by *Concoction*, and *Maturacion*, which is euer most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilst the Spirit is enclosed in the *Root*; And the Spirit doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that haue their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *insipide*; As *Ginger*. The Cause is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which under the *Earth* is contained and held in; But when it cometh to the *Aire*, it exhalen.

The *Iuyces* of *Fruits* are either *Watry*, or *Oily*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Pear*, the *Cherry*, the *Pomegranate*, &c. And there are some others, which, though they be not in vse for *Drinke*, yet they appeare to be of the same Nature; As *Plummes*, *Seraces*, *Mulberries*, *Ruffs*, *Oranges*, *Lemons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculag admittis imitantur vitea Sorbis.

And it may be *Heps* and *Brier-Berries* would doe the like. Those that haue *Oily* Iuyce, are; *Oliues*, *Almonds*, *Nuts* of all sorts, *Pine Apples*, &c. And their Iuyces are all *Inflammable*. And you must obserue also, that some of the *Watry* Iuyces, after they haue gathered Spirit, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruits*, that is sweet, without either *Sharpnesse*, or *Oylinesse*: Such as is the *Fig*, and the *Date*.

It hath beene noted, that most *Trees*, and specially those that beare *Maſt*, are fruitfull but once in two yeares. The Cause (no doubt) is, the *Expense* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare diuers yeares together.

There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are *Inflammable*; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Mistletoe*, though rarely. The Cause of all these may be, the *Cloſeness* and *Solidness* of the *Wood*, and *Pith* of the *Oake*; Which maketh seuerall Iuyces finde seuerall *Eruptions*. And therefore,

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if you will deuise to make any *Super-Plants*, you must euer giue the *Sap* Plentiful Rising, and Hard Issue.

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There are two *Excreſcences*, which grow vpon *Trees*; Both of them in the Nature of *Mushromes*: The one the *Romans* called *Boletus*; Which groweth vpon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we haue ſpoken before,) which groweth vpon the *Tops* of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceiue, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*.

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The greater Part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughs*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as *Shade* doth more good to, than *Hurt*. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, hauing but a ſhort *Way*: And therefore in *Fruits* ſpred vpon *Walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower Boughs*; Except it be in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therefore, they are either Strong *Trees*, as the *Oake*; Or elſe they haue large *Leaues*, as the *Walnut* and *Fig*; Or elſe they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plummes*, &c.

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There be *Trees*, that beare beſt, when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that giue *Maiſt*. The *Cauſe* is, for that all *Trees* that beare *Maiſt*, haue an *Oily Fruit*; And *Young Trees* haue a more *Watry Iuyce*, and leſſe *Concocted*; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oily*, yet it requireth much *Sap*, and well *Concocted*; For we ſee it is a *Heavy Fruit*, and *Solide*; Much more than *Apples*, *Plummes*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *Wine*, when it is *Old*; For that the *Iuyce* is better *Concocted*: And wee ſee that *Wine* is *Inflammable*; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt wich are *Apples*, *Plummes*, &c. beare beſt when they are *Young*.

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There be *Plants*, that haue a *Milke* in them, when they are *Cut*; As *Figs*, *Old Lettuce*, *Sowe-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* haue all an *Acrimony*; though one would thinke they ſhould be *Lenitive*. For if you write vpon *Paper*, with the *Milke* of the *Fig*, the *Letters* will not be ſeene, vntill you hold the *Paper* before the *Fire*, and then they wax *Browne*; Which ſheweth that it is a *Sharpe* or *Fretting Iuyce*: *Lettuce* is thought *Poyſonous*, when it is *Old*, as to haue *Milke*; *Spurge* is a kinde of *Poyſon* in it ſelfe; And as for *Sowe-Thiſtles*, though *Coneyes* eat them, yet *Sheepe* and *Cattell* will not touch them; And beſides the *Milke* of them, rubbed vpon *Warts*, in ſhort time, weareth them away: Which ſheweth the *Milke*

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of them to be *Corrosive*. We see also, that *Whit*, and other *Corns* sown, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed*. *Euphorbium* also hath a *Milke*, though not very white, which is of a great *Astringency*. And *Saladine* hath a yellow *Milke*, which hath likewise much *Astringency*; For it cleanseth the *Eyes*. It is good also for *Cataracts*.

Mushrooms are reported to grow, as well vpon the *Bodies* of *Trees*, as vpon their *Bark*s, or vpon the *Earth*: And especially vpon the *Oake*. The *Cause* is, for that *Strong Trees*, are towards such *Excreescences*, in the Nature of *Earth*; And therfore put forth *Mosse*, *Mushrooms*, and the like.

There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Leafe*; Except it be the *Tree* that beareth *Sanguis Draconis*: Which groweth (chiefly) in the *Island Saquer*: The *Herb Amaranthus*, (indeed,) is *Red* all ouer; And *Brasill* is *Red* in the *Wood*: And so is *Red Sanders*. That *Tree* of the *Sanguis Draconis* groweth in the forme of a *Sugar-loafe*. It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree*. For wee see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare*: And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not vp; And besides it is very *Astringent*; And therefore of *Slow Motion*.

It is reported, that *Sweet Mosse*, besides that vpon the *Apple-Trees*, groweth likewise (sometimes) vpon *Poplars*; And yet (generally) the *Poplar* is a *Smooth Tree* of *Bark*, and hath little *Mosse*. The *Mosse* of the *Laric Tree* burneth also *Sweet*, and sparkleth in the *Burning*. *Querc* of the *Mosses* of *Odorate Trees*, As *Cedar*, *Cypres*, *Lignum Aloes*, &c.

The *Death* that is most without *Paine*, hath been noted to be, vpon the *Taking* of the *Potion of Hemlocke*; which in *Humanity* was the *Forme* of *Execution* of *Capital Offenders* in *Athens*. The *Poyson* of the *Aspe*, that *Cleopatra* vsed, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the *Strife* of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme *Old Man*. I conceiue it is lesse *Painfull* than *Opium*, because *Opium* hath *Parts* of *Heat* mixed.

There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are *Sweet* before they ripen, and after grow *Spicy*. And some neuer *Ripen* to be *Sweet*; As *Tamarinds*, *Berberries*, *Crabs*, *Sloes*, &c. The *Cause* is, for that the former Kinde haue much and subtil *Heat*, which causeth *Earely Sweetnesse*; The latter haue a *Cold* and *Acid Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath *Parts* of *Contrary Natures*; For it is *Sweet*, and yet *Astringent*.

There be few *Herbes* that haue a *Salt Tasse*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltnesse*: The *Cause* may be, for that *Salt*, though it be the *Rudiment* of *Life*, yet in *Plants* the *Originall Tasse* remaineth

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remaineth not; For you shall haue them *Bitter, Sowre, Sweet, Biting*, but seldome *Salt*: But in *Living Creatures*, all those *Hgh Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oily Nature*; which is not very Susceptible of those *Tastes*; And the *Saltneffe* it selfe of *Bloud*, is but a light, and seeret *Saltneffe*: And euen among *Plants*, some doe participate of *Saltneffe*, as *Alga Marina, Sampire, Scoruy-Graffe, &c.* And they report, there is, in some of the *Indian-Seas*, a *Swimming Plant*, which they call *Salga-zus*, spreading ouer the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes* of all *Plants*, they extract a *Salt*, which they vse in *Medicines*.

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It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincoltis*, which is full of *Prickles*: This *Herbe* putteth forth another small *Herbe* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I haue seene, for a great Rarity, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top and Top-gallants*.

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Burley, (is appeareth in the *Malting*.) being steeped in *Water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned vpon a dry floare, will sprout, halfe an Inch long at least: And if it be let alone, and not turned, much more; vntill the Heart be out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vine*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would be further driuen: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first Sprouting of *Plants*; And we see that *Rose-Buds* set in *Water*, will Blow: Therefore try whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herbe*, or *Flower*, with *Water* onely; Or some small Commixture, of *Earth*: For if they will, it shoud seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may giue some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

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Malt in the *Drenshing* will swell; And that in such a manner, as after the Putting forth in *Sprouts*, and the drying vpon the *Keele*, there will be gained at least a Bushell in eight, and yet the *Sprouts* are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped.

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Malt gathereth a *Sweetneffe* to the *Taste*, which appeareth yet more in

in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things* *Instrumentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Veeds* in the Growing, leave their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The Cause may be, for that the *Skin* or *Huske* is not easie to *break*; As we see by the *Pilling* of *Onion*, what a Holding *Substance* the *Skin* is.

Plants, that haue *Curled Leauers*, doe all abound with *Moisture*; Which commeth so fast on, as they cannot spread themselues *Plaine*, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Choy*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*.

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Petrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like *Hard Sugar*.

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Oline*, &c. The Cause of this latter may be, for that such *Trees* as loue the *Sunne*, doe not willingly descend farre into the *Earth*; And therefore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, vnder *Ground*, to auoid Receffe from the *Sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which haue beene planted too deepe in the *Ground*, that for loue of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And wee see also, that the *Oline* is full of *Oylie Inyces*; And *Ash* maketh the best *Fire*; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loueth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they haue so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also, that haue the same difference; As the *Herbe* they call *Morsus Diaboli*; Which putteth the *Root* downe so low, as you cannot pull it vp without *Breaking*; Which gaue Occasion to the *Name*, and *Fable*; For that it was said, it was so whole some a *Root*, that the *Deuill*, when it was gathered, bit it for *Enuy*: And some of the *Ancients* doe report, that there was a *Goodly Firre*, (which they desired to remoue whole,) that had a *Root* vnder *Ground* eight Cubits deepe; And so the *Root* came vp broken.

It hath beene obserued, that a *Branch* of a *Tree*, being *Vnbarbed* some space at the *Bottom*, and so set into the *Ground*, hath growen; Euen of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above

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Ground, will die. The Cause may be, for that the *Vnburkt Part* draweth the Nourishment best, but the *Barke* continueth it only.

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Grapes will continue *Fresh*, and *Moist*, all Winter long, if you hang them, *Cluster by Cluster*, in the *Roofe* of a *Warme Roome*; Especially, if when you gather the *Cluster*, you take off with the *Cluster* some of the *Stock*.

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The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath these Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*; That it putteth forth no *Boughs*, though many *Stalkes* come out of one *Root*. It differeth much in Greatnesse; The smallest being fit for Thatching of Houses; And Stopping the Chinkes of Ships; Better than *Glew*, or *Pitch*. The Second Bignesse, is vsed for *Angle-Rods*, and *Staues*; And in *China* for beating of Offenders vpon the Thighs. The differing *Kindes* of them are; The *Common Reed*; The *Cassia Fissula*; And the *Sugar-Reed*. Of all *Plants*, it boweth the easiest, and riseth againe. It seemeth, that amongst *Plants*, which are nourished with *Mixture* of *Earth* and *Water*, it draweth most Nourishment from *Water*; which maketh it the *Smoothest* of all others in *Barke*; And the *Hollowest* in *Body*.

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The *Sap* of *Trees*, when they are let *Blond*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Pearres*. Some *Thicke*; As *Apples*. Some *Gummie*; As *Cherries*. Some *Froathie*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* seemeth to be (almost) towards the *Barke* only; For if you cut the *Tree*, a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be *drie*. The *Trees*, which haue the *Moistest Iuyces* in their *Ernit*, haue commonly the *Moistest Sap* in their *Body*; For the *Vines* and *Pearres* are very *Moist*; *Apples* somewhat more *Spongie*: The *Milke* of the *Figge* hath the *Qualitie* of the *Rennet*, to gather *Cheese*: And so haue certaine *Soure Herbs* wherewith they make *Cheese* in *Lent*.

658

The *Timber* and *Wood* are, in some *Trees*, more *Cleane*, in some more *Knottie*: And it is a good *Triall*, to trie it by *Speaking* at one End, and *Laying* the *Eare* at the Other: For if it be *Knottie*, the *Voice* will not passe well. Some haue the *Veines* more varied, and chamlotted; As *Oake*, whereof *Wainscot* is made; *Maple*, whereof *Trenchers* are made: Some more smooth, as *Firre*, and *Walnut*: Some doe more easily breed *Wormes* and *Spiders*; Some more hardly, as it is said of *Irish Trees*: Besides, there be a Number of Differences that concerne their *Vse*; As *Oake*, *Cedar*, and *Chestnut*, are the best *Builders*: Some are best for *Plough-Timber*; As *Ash*: Some for *Peeves*, that are sometimes wet, and sometimes *drie*; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Desks*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moist Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnaunce*; Wherein *Englisb* and *Irish Timber* are thought to excell: Some for *Masts* of *Ships*; As *Firre*, and *Pine*, because of their Length,

Length, Straightnesse, and Lightnesse: Some for *Pale*; As *Oake*: Some for *Fuel*; As *Asb*: And so of the rest.

The *Cumming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is sometimes *Casual*: For many haue beene translated, and haue prospered well; As *Damask-Roses*, that haue not beene knowne in *England* about an hundred yeares, and now are so common. But the liking of *Plants* in certaine *Solles*, more than in others, is meerly *Naturall*; As the *Firre* and *Pine* loue the *Mountaines*; The *Poplar*, *Willow*, *Sallow*, and *Alder*, loue *Rivers*, and *Moist Places*: The *Asb* loueth *Coppices*; But is best in *Standards* alone: *Iuniper* loueth *Chalke*; And so doe most *Fruit-Trees*: *Sampire* groweth but upon *Recks*: *Reeds* and *Osiers* grow where they are washed with *Water*: The *Pine* loueth *Sides of Hills*, turning vpon the *South-East Sun*, &c.

The *Putting forth* of certaine *Herbs* discovereth of what *Nature* the *Ground* where they put forth, is: As *wilde Thyme* sheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* shew *Grounds* fit for *Wood*: *Camomill* sheweth *Mellow Grounds* fit for *Wheat*. *Mustard Seede*, growing after the *Plough*, sheweth a good *Strong Ground* also for *Wheat*: *Burnet* sheweth good *Meadow*: And the like.

There are found, in diuers *Countries*, some other *Plants*, that grow out of *Trees* and *Plants*, besides *Mistletoe*: As in *Syria*, there is an *Herbe* called *Cassius*, that groweth out of tall *Trees*, and windeth it selfe about the same *Tree* where it groweth; And sometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewise an *Herbe* called *Faunos*, vpon the *Wilde Olive*. And an *Herbe* called *Hippophastron* vpon the *Fullers Thorne*; Which, they say, is good for the *Falling-Sicknesse*.

It hath beene obserued, by some of the *Ancients*, that howsoever *Cold* and *Easterly Winds*, are thought to be great *Enemies* to *Fruit*; yet neuertheless *South-Winds* are also found to doe *Hurt*; Especially in the *Blossoming* time; And the more, if *Showers* follow. It seemeth, they call forth the *Moisture* too fast. The *West Winds* are the best. It hath beene obserued also that *Greene* and *Open Winters* doe hurt *Trees*; Inasmuch as if two or three such *Winters* come together, *Almond-Trees*, and some other *Trees*, will dye. The *Cause* is the same with the former, because the *Lust* of the *Earth* ouerspendeth it selfe; Howsoever some other of the *Ancients* haue commended *Warne Winters*.

Snowes, lying long, cause a *Fruitfull Yeare*: For first, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) sucke the *Water*, as out of the *Teate*. Thirdly, the *Moisture* of *Snow* is the finest *Moisture*; For it is the *Froth* of the *Cloudy Waters*.

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moist Fruits*; As *Vines*, *Oliues*, *Pomegranates*; Yet it is rather for *Plenty*, than for *Goodnesse*; For the best *Wines* are in the *Driest Vintages*: *Small Showers* are likewise good for *Corne*, so as

Parching Heats come not vpon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast vpon them: And we see, euen in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Euening*.

665

The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easiliest *Soften*, is commended; And yet some *Earth* of that kinde will be very *Dry*, and *Hard* before the *Showers*. The *Earth* that casteth vp from the *Plough*, a *Great Clod*, is not so good, as that, which casteth vp a *Smaller Clod*. The *Earth*, that putteth forth *Mosse* easily, and may bee called *Mouldy*, is not good. The *Earth*, that smelleth well vpon the *Digging*, or *Ploughing*, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-Bowes*, fall more vpon one kinde of *Earth* than vpon another: As it may well be; For that that *Earth* is most *Roscide*: And thertore it is commended for a *Signe* of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more *da:ke*: But if the *Herbs* shew *Withered*, or *Blasted* at the *Top*, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is loone *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and *Barren* in his owne *Nature*. The *Tender*, *Cheffome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two *Extreames* of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaning*, and full of *Iuyce*.

666

It is strange, which is obserued by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnessse* of *Trees*; And of *Vines*, by name: Insomuch as they cast *Dust* vpon them of purpose. It should seeme, that that *Powdring*, when a *Shower* commeth, maketh a kinde of *Soyling* to the *Tree*, being *Earth* and *Water*, finely laid on. And they note, that *Countries*, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667

It is commended by the *Ancients*, for an *Excellent Helpe* to *Trees*, to lay the *Stalks* and *Leaues* of *Lupines* about the *Roots*; Or to *Plough* them into the *Ground*, where you will sowe *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them vpon *land*, doth much *Good*. And it was generally receiued of old, that the *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more *thirsty*, and open, to receiue the *Dung*.

668

The *Grafting* of *Vines* vpon *Vines*, (as I take it,) is not now in vse: The *Ancients* had it, and that three wayes: The *First* was *Insution*, which is the *Ordinary Manner* of *Grafting*: The *Second* was *Terebration*, through the *Middle* of the *Stocke*, and *Putting* in the *Cions* there: And the *Third* was *Paring* of two *Vines*, that grow together, to the *Marrow*, and *Binding* them close.

669

The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to helpe them; Whereas many of them are not to be remedial. The *Millem* is one of the Greatest; which (out of question) commeth by *Closeting* of *Aire*; And therefore in *Hills*, or large *Champaign Grounds*, it seldom commeth; Such as is with vs *York's Wold*. This cannot be remedied, otherwise than that in *Countries* of Small Enclosure, the *Grounds* be turned into larger *Fields*: Which I haue knowne to doe good in some *Farmes*. Another *Disease* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (especially *Barley*,) doth degenerate. It happeneth chiefly from the *Weaknesse* of the *Graine* that is sown; For if it be either too Old, or Mouldy, it will bring forth *Wilde Oats*. Another *Disease* is the *Society* of the *Ground*; For if you sow one *Ground* full with the same *Corne*, I meane not the same *Corne* that grew vpon the same *Ground*,) but the same *Kind* of *Graine*; (As *Wheat*, *Barley*, &c.) it will prosper but poorly: Therefore besides the *Raising* of the *Ground*, you must vary the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flouring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Accident* is, *Drouth*, at the *Spawling* of the *Corne*; Which with vs is rare; But in Hotter *Countries*, common: Inso much as the Word, *Calamitas*, was first deriued from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with vs breedeth much *Dearth*; Inso much as the *Corne* neuer commeth vp; And (many times) they are forced to resow *Sommer-Corne*, where they sowed *Winter-Corne*. Another ill *Accident* is *Bitter Frosts*, continued, without *Snow*; Especially in the Beginning of the *Winter*, after the *Seed* is new Sown. Another *Disease* is *Wormes*; which sometimes breed in the *Root*, and happen vpon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Especially when Hot *Sunnes* breake often out of *Clouds*. Another *Disease* is *Weeds*; And they are such, as either Choake, and Querthadow the *Corne*, and beare it downe; Or starue the *Corne*, and deceme it of Nourishment. Another *Disease* is, *Over-Rancknesse* of the *Corne*; Which they vse to remedy, by *Mowing* it after it is come vp; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Huruelst*. Another ill *Accident* is, if the *Seed* happen to haue touched *Oyle*, or any *Thing*, that is *Fat*; For those *Substances* haue an *Antipathy* with Nourishment of *Water*.

The *Remedies* of the *Diseases* of *Corne* haue beene obserued as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preseruatue*: The *Mingling* of *Seed-Corne* with *Albes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* sound: It hath not beene practised, but it is thought to be of vse, to make some *Miscellane* in *Corne*; As if you sow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath beene obserued, that the *Sowing* of *Corne* with *Honsleeke*, doth good. Though *Graine*, that toucheth

toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to *Putrifie*, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but *Emptier*, and having More of the *Huske*.

671 It hath beene noted, that *Seed* of a yeare old, is the Best; And of two or three yeares is Worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Yawning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672 It hath beene obserued, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Insomuch as it hath bin knowne to go three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide* *Herbe*, that (as it seemeth) loueth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene obserued, that some *Herbs* like best, being watred with *Salt-Water*; As *Radiſh*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally receiued, how some *Poysonous Beasts* affect *Odorate* and *Wholesome Herbs*; As that the *Snake* loueth *Fennell*; That the *Toad* will be much vnder *Sage*; That *Frogs* will be in *Cinque foile*. It may be, it is rather the *Shade*, or other *Couerture*, that they take liking in, than the *Vertue* of the *Herbe*.

675 It were a Matter of great Profit, (saue that I doubt it is too Coniuncturall to venture vpon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the *Yeare*: For as for those, that are like to be in *Plenty*, they may be bargained for, vpon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to be rich, when he fore-saw a great *Plenty* of *Olines*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long Continuance of *Snow* is beleeued to make a *Fruitfull Yeare* of *Corne*: An *Earely Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An *Open* and *Serene Winter*, an ill *Yeare* of *Fruit*: These we haue partly touched before: But other *Prognosticks* of like Nature are diligently to be enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Oline* hath the *Oyle Part*, only on the *Outside*; Whereas all other *Fruits* haue it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernells*. The *Pomgranate* and *Pine-Apple* haue onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* haue *Curled Leauces*, but *Cabbage*, and *Cabbage-Lettuce*. None haue double *Leauces*, one belonging to the

the *Stalks*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kinde of *Spread* that the *Woodbine* hath. This may be a large *Field* of *Contemplation*; For it sheweth that in the *Frame* of *Nature*, there is, in the *Producing* of some *Species*, a *Composition* of *Matter*, which happeneth oft, and may be much *diuersified*: In others, such as happeneth rarely, and admitteth little *Variety*: For so it is likewise in *Beasts*: *Dogs* haue a *Resemblance* with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffes*; *Hares* with *Coneyes*; &c. And so in *Birds*: *Kites* and *Kestrells* haue a *Resemblance* with *Hawkes*; *Common-Doues* with *Ring-Doues*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Manisses*; *Crowes* with *Rauens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird of Paradise*, and the *Peacocke* amongst *Birds*; And some few others; haue scarce any other *Species*, that haue *Affinity* with them.

We leaue the *Description* of *Plants*, and their *Virtues*, to *Herbals*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, euen to *Curiosity*: For our *Experiments* are onely such, as doe euer ascend a *Degree*, to the *Deriuing* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant, but that some, both of the *Ancient*, and *Moderne Writers*, haue also laboured, But their *Causes*, and *Axiomes*, are so full of *Imagination*, and so infected with the old *Receiued Theories*, as they are meere *Inquinations* of *Experience*, and *Concoct* it not.

It hath beene obserued, by some of the *Ancients*, that *Skins*, (especially of *Rams*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from *Swelling*, and *Exulcerating*; And likewise Heale them, and Close them vp; And that the *Whites* of *Eggs* do the same. The *Cause* is a *Temperate Conglutination*; For both *Bodies* are *Clammy*, and *Viscous*, and doe bridle the *Deflux* of *Humours* to the *Hurts*, without *Penning* them in too much.

You may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into *Peeces*, and put the *Peeces* into a *Glasse* couered with *Parchment*; And so let the *Glasse* stand six or seuen *Houres* in *Boyling Water*. It may be an *Experiment* of *Profit*, for *Making* of *Fat*, or *Grease*, for many vses; But then it must be of such *Flesh* as is not *Edible*, As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

Experiment
Solitary touch-
ing Healing
of Wounds.

677

Experiment
Solitary, touch-
ing Fat dissol-
ved in Flesh.

678

It

Experiment
Solitary, touch-
ing *Repening*
of *Drunk* before
the *Time*.

679

Experiment
Solitary, touch-
ing *Pilosity*
and *Plumage*.

680

It is reported by one of the *Ancients*, that *New Wine*, put into *Vessells* well stopped, and the *Vessells* let downe into the *Sea*, will accelerate very much, the Making of them Ripe, and Potable. The same would be tried in *Wort*.

Beasts are more *Hairy* than *Men*; And *Savage Men* more than *Ciwill*; And the *Plumage* of *Birds* exceedeth the *Pilosity* of *Beasts*. The Cause of the Smoothnesse in *Men*, is not any Abundance of *Heat*, and *Moisture*, though that indeed causeth *Pilosity*; But there is requisite to *Pilosity*, not so much *Heat* and *Moisture*, as *Excrementitious Heat* and *Moisture*: (For whatsoeuer assimilath, goeth not into the *Haire*:) And *Excrementitious Moisture* aboundeth most in *Beasts*, and *Men* that are more *Savage*. Much the same Reason is there of the *Plumage* of *Birds*; For *Birds* assimilate lesse, and exerne more than *Beasts*: For their *Excrements* are euer liquid, and their *Flesh* (generally) more dry: Besides, they have not *Instruments* for *Frine*; And so all the *Excrementitious Moisture* goeth into the *Feathers*: And therefore it is no Maruell, though *Birds* bee commonly better Meat than *Beasts*, because their *Flesh* doth assimilate more finely, and fecerneth more subtilly. Againe, the *Head* of *Man* hath *Haire* vpon the first *Birthe*, which no other Part of the *Body* hath. The Cause may be Want of *Perspiration*: For Much of the Matter of *Haire*, in the other Parts of the *Body*, goeth forth by Insensible *Perspiration*; And besides, the *Skull* being of a more solide Substance, nourisheth and assimilath lesse, and excerneth more: And so likewise doth the *Chinne*; We see also that *Haire* commeth not vpon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are Parts more *Perspirable*. And *Children* likewise are not *Hairy*, for that their *Skins* are more *Perspirable*.

Experiment
Solitary, touch-
ing the
Quicknesse of
Motion in
Birds.

681

Birds are of *Swifter Motion* than *Beasts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beasts*. The Cause is, for that the *Spirits* in *Birds*, are in greater Proportion, in comparison of the Bulke of their *Body*, than in *Beasts*: For as for the Reason that some giue, that they are partly Carried, whereas *Beasts* goe, that is Nothing; For by that Reason Swimming should be swifter, than Running: And that Kinde of Carriage also, is not without Labour of the *Wing*.

Experiment
Solitary, touch-
ing the differ-
ent *Clearenesse*
of the *Sea*.

682

The *Sea* is *Clearer*, when the *North-wind* bloweth, than when the *South-wind*. The Cause is, for that *Salt-Water* hath a little *Oyliness* in the *Surface* thereof; As appeareth in very Hot Daies: And againe, for that the *Southerne Wind* relaxeth the *Water* somewhat; As no *Water* Boyling is so *Clear* as *Cold Water*.

Experiment
Solitary touch-
ing the differ-
ent Heats of
Fire and Boiling
Water.

683

Fire burneth *Wood*, making it first *Luminous*; Then *Blacke* and *Bristle*; And lastly, *Broken* and *Incinerate*: *Scalding Water* doth none of these. The Cause is, for that by *Fire*, the *Spirit* of the *Body* is first *Refined*, and then *Emitted*; Whereof the *Refining*, or *Attenuation* causeth the *Light*; And

And the *Emulsion*, first the *Fragilitie*, and after the *Disfolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refused* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguiſh it: Therefore wee ſee that *Hot Water* will quench *Fire*. And againe wee ſee, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* paſſeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges* *Boyled*, and *Roasted*, (into which the *Water* entreth not at all,) there is ſcarce difference to be diſcerned; But in *Fruit*, and *Fleſh*, whereinto the *Water* entreth, in ſome Part, there is much more difference.

The *Bottoms* of a *Veſſell* of *Boyling Water*, (as hath beene obſerved,) is not very much *Heated*; So as Men may put their *Hand* vnder the *Veſſell*, and remoue it. The *Cauſe* is, for that the *Moſſure* of *Water*, as it quen- ceth *Coales*, where it entreth; So it doth allay *Heat*, where it toucheth: And therefore note well, that *Moſſure*, although it doth not paſſe thro- row *Bodies*, without *Communication* of ſome *Subſtance*, (As *Heat* and *Cold* doe;) yet it worketh manifeſt Effects; not by Entrance of the *Bo- dy*, but by *Qualifying* of the *Heat*, and *Cold*; As wee ſee in this *In- ſtance*: And wee ſee likewise, that the *Water* of *Things* diſtilled in *Water*, (which they call the *Bath*,) differeth not much from the *Water* of *Things* diſtilled by *Fire*: Wee ſee alſo, that *Pewter-Diſhes*, with *Water* in them, will not Melt eaſily; But without it, they will: Nay wee ſee more, that *Butter*, or *Oyle*, which in themſelues are *Inflammable*, yet by Vertue of their *Moſſure*, will doe the like.

Experiment
Solitary, tou-
ching the *Quali-
fication* of *Water*
by *Moſſure*.

684

It hath beene noted by the *Ancients*, that it is dangerous to Picke ones *Eare*, whileſt he *Tawneth*. The *Cauſe* is, for that in *Tawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Tawning*, and *Snoring* both, the *Spirit* is firſt ſtrongly Drawne in, and then ſtrongly Expelled.

Experiment
Solitary, tou-
ching *Tawning*.

685

It hath beene obſerved by the *Ancients*, that *Sneezing* doth ceaſe the *Hiccough*. The *Cauſe* is, for that the *Motion* of the *Hiccough*, is a *Liſting* up of the *Stomacke*; which *Sneezing* doth ſomewhat depreſſe, and diuert the *Motion* another way. For firſt wee ſee, that the *Hiccough* commeth of *Fulneſſe* of *Meat*, (eſpecially in *Children*;) which cauſeth an *Extenſion* of the *Stomacke*: Wee ſee alſo, it is cauſed by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceaſed, ei- ther by *Diuerſion*; Or by *Detention* of the *Spirits*: *Diuerſion*, as in *Snee- zing*; *Detention*, as wee ſee *Holding* of the *Breath*, doth helpe ſomewhat to ceaſe the *Hiccough*: And putting a Man into an Earneſt Studie doth the like; As is commonly vſed: And *Vinegar* put to the *Noſthrills*, or *Gargarized*, doth it alſo; For that it is *Aſtringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment
Solitary, tou-
ching the *Hic-
cough*.

686

Experiment
Solitary, touch-
ing *Sneezing*

687

Looking against the Sunne, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Noshrills*; For then the *Holding* vp of the *Noshrills* against the *Sunne*, though one *Winke*, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Noshrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Noshrills* within, doth draw the *Moisture* to the *Noshrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene obserued, that if one be about to *Sneeze*, the *Rubbing* of the *Eyes*, till they run with *Water*, will preuent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Noshrills*, is diuer- ted to the *Eyes*.

Experiment
Solitary, touch-
ing the *Ten-
dernes* of the
Teeth.

688

The *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double: The *One*, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The *Other* is, for that the *Teeth* are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore wee see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in *Sharpe Colds* wax *Brittle*; And therefore, it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to *Cure*.

Experiment
Solitary, touch-
ing the
Tongue.

689

It hath beene noted, that the *Tongue* receiueh, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blacknesse* of the *Tongue*. Againe, *Pied Castell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tendernesse* of the *Part*; which thereby receiueh more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment
Solitary, touch-
ing the
Taste.

690

When the *Mouth* is out of *Taste*, it maketh *Things* taste, sometimes *Salt*; Chiefly *Bitter*; And sometimes *Loathsome*; But neuer *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Butter*, and *Salt*, and *Loathsome*; But *Sweet* neuer; For the rest are *Degrees* of *Corruption*.

Experiment
Solitary touch-
ing some
Prognosticks of
Peftilentiall
Seasons.

691

It was obserued in the *Great Plague* of the last Yeare, that there were seene, in diuers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (vsually) haue no *Tailes* at all. Which argueth a great *Disposition* to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parfnips*,) are more *Sweet*, and *Lushions*, in *Inte-
tious* Yeares, than in other Yeares.

Experiment
Solitary touch-
ing *Speciall*
Simples for
Medicines.

692

Wise Physitians should with all diligence inquire, what *Simples* *Nature* yeeldeth, that haue extreme *Subtile Parts*, without any *Mordication*,

or *Acrimony*; for they Undermine that which is *Hard*; They open that which is *Stopped*, and *Shut*; And they expell that which is *Offensive*, gently, without too much *Perturbation*. Of this kinde are *Elder-Flowers*, which therefore are Proper for the *Stone*: Of this kinde is the *Trinse-Pine*; which is Proper for the *Jaundies*: Of this kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections*: Of this kinde is *Piony*; which is Proper for *Stoppings* in the *Head*: Of this kinde is *Fumitory*; which is Proper for the *Spleen*: And a Number of Others. Generally, dauntless *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snails*, &c. And I conceive, that the *Trachus* of *Pipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited, and corrected, (which of late are growing into some *Credite*,) are of the same Nature. So the *Parts* of *Beasts* *Putrified*; (as *Castoreum*, and *Muske*, which have extreme *Subtil Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricks*, and *Jewes-Eare*,) are of greatest *Verme*. The *Cause* is, for that *Putrefaction* is the *Subtillest* of all *Motions*, in the *Parts* of *Bodies*: And since we cannot take downe the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could be taken downe,) would make us *immortall*;) the Next is for *Subtillty* of *Operation*, to take *Bodies Putrified*; Such as may be safely taken.

It hath bene observed by the *Ancients*, that *Much Use* of *Venus* doth *Dimine* the *Sight*: And yet *Eunuchs*, which are vnable to generate, are (nevertheless) also *Dimine Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the *Former*, is the *Expense* of *Spirits*: In the *Latter*, the *Over-moisture* of the *Brain*: For the *Over-moisture* of the *Brain* doth thicken the *Spirits* *Pulch*, and obstructeth their *Passages*; As we see by the *Decay*, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurrith as another *Cause*: we see also that *Blindeesse* cometh by *Thoumes*, and *Cataracts*. Now in *Eunuchs*, there are all the *Notes* of *Moisture*; As the *Sweeling* of their *Thighs*; the *Loosenesse* of their *Belly*, the *Smoothnesse* of their *Skinne*, &c.

The *Pleasure* in the *Act* of *Venus* is the greatest of the *Pleasures* of the *Senses*: The *Mixing* of it with *Itch* is vnproper; though that also be *Pleating* to the *touch*. But the *Causes* are *Profound*. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many *Seuerall Species* of *Motions*, and *Pleasures*, or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *Sight*, *Hearing*, *Taste*, and *Smell*, are of *seuerall Frame*; And so are the *Parts* for *Generation*. Therefore *Nature* doth well, to make the *Pleasure* of *Generation* a *Sixth Sense*, And if there were any other differing *Organs*, and *Qualified Perforations*, for the *Spirits* to passe; there would be more than the *Fine Senses*: Neither doe we well know, whether some *Beasts*, and *Birds*, have more *Senses* than we know of: And the very *Sense* of *Dogs* is almost a *Sense*, by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and deeper,

Experiments
in Confort
touching Ve-
nus.

693

694

deeper, than those of the other *Senses*; As we see in *Warming* vpon *Cold*; Or *Refrigeration* vpon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits* immediately, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, wee see their great and sudden Effect in fetching *Men* againe, when they swoone: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkenesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* moue, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

695

It hath beene alwayes obserued, that *Men* are more inclined to *Venus* in the *Winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a Body more Hot and dry, (as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Use* of *Venus*, in *Moist* and well *Habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is euident; For that it is a Principall *Euacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Euacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments
in Consort
touching the
Insecta.

The *Nature* of *Viniification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceiued, in Small, than in Great; and in vnperfect, than in perfect, and in Parts, than in whole: So the *Nature* of *Viniification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Viniification*. Secondly, in *Disclosing* the *Originall* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to worke *Effects* vpon *Perfect Creatures*. Note that the word *Insecta*, agreeth not with the Matter, but we cuer vse it for Breuities sake, intending by it *Creatures* bred of *Putrefaction*.

696

The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserve it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions*

ans of *Nourishment*. Some breed in *Wood*, both Growing, and Cut down. *Quare* in what *Woods* most, and at what *Seasons*? We see that the *Worms* with many Feet, which round themselves into Balls are bred chiefly vnder *Logs* of *Timber*, but not in the *Timber*; And they are said to be found also, (many times,) in *Gardens*, where no *Logs* are. But it seemeth their *Generation* requireth a *Couerture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therefore they are not *Venemous*, but (contrariwise) are held by the *Physitians* to clarify the *Bloud*. It is obserued also that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* close kept, and somewhat acrid by the *Haire*. The *Excrements* of *Living Creatures*, do not only breed *Insecta*, when they are *Excerned*, but also while they are in the *Body*; As in *Wormes*, whereto Children are most subiect, and are chiefly in the *Guts*. And it hath beene lately obserued by *Physitians*, that in many *Pesilent Diseases*, there are *Wormes* found in the vpper Parts of the *Body*, where *Excrements* are not, but onely *Humours Putrified*. *Eles* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moisture*; Or the *Chamber* and *Bed-straw* kept close, and not *Aired*. It is receiued that they are killed by *Strewing Worme wood* in the *Rooms*. And it is truly obserued, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are aptest to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the shape of a large white *Maggot*, which is giuen as a great *Dainty* to *Nightingales*. The *Mouth* breedeth vpon *Cloath*, and other *Lanifices*; Especially if they be laid vp dankish, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Worm*, bred vnder *Ground*, and that feedeth vpon *Roots*; As *Parsnips*, *Carrets*, &c. Some breed in *Waters*, especially shaded, but they must be *Standing-waters*; As the *Water-Spider*, that hath six *Legs*. The *Fly* called the *Gad-fly*, breedeth of somewhat that *Swim-meth* vpon the *Top* of the *Water*, and is most about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obserued by some of the *Ancients*,) turneth into a *Gnat*. It hath bin obserued by the *Ancients*, that there is a *Worme* that breedeth in old *Snow*, and is of Colour *Reddish*, and dull of *Motion*, and dieth soone after it commeth out of *Snow*. Which should shew, that *Snow* hath in it a secret *Warmth*. For else it could hardly *Viue*. And the Reason of the *Dying* of the *Worme*, may be the sudden *Exhaling* of that little *Spirit*, as soone as it commeth out of the *Cold*, which had shut it in. For as *Butterflies* quicken with *Heat*, which were benumbed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preserued in *Cold*. It is affirmed both by *Ancient* and *Moderne Observation*, that in *Furnaces* of *Copper*, and *Brasse*, where *Chalcites*, (which is *Yatriol*), is often cast in, to mend the working there riseth suddenly a *Fly*, which sometimes moueth, as if it tooke hold on the walls of the *Furnace*; Sometimes is scene mouing in the *Fire* below; And dieth presently, as soone as it is out of the *Furnace*. Which is a Noble *Instance*, and worthy to be weighed; for it sheweth that as well

Violent

Violent Heat of Fire, as the *Gentle Heat of Living Creatures*, will Viuifie, if it haue Matter Proportionable. Now the great *Axiome* of *Viuification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be put forth, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as euer it cooleth neuer so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as we see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of seuerall Names; But wee will not take vpon vs now, to Enumerate them all.

697

The *Insecta* haue beene noted by the *Ancients*, to feed little: But this hath not beene diligently obserued; For *Grasshoppers* eat vp the *Greene* of whole *Countries*; And *Silke-wormes* deuoure *Leaues* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*. The *Integrall Parts* haue Extreme Variety, but the *Similar Parts* little. It is true, that they haue, (some of them,) a *Diaphragme*, and an *Intestine*. And they haue all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* haue beene knowne to liue seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to liue till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will liue and grow very long: And those that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, haue beene kept in *Boxes* foure yeares at the least. Yet there are certain *Flyes*, that are called *Ephemera*, that liue but a day. The *Cause* is, the Exility of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might liue longer. Many of the *Insecta*, (as *Butterflies*, and other *Flyes*,) renew easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vital Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in *Pieces*; Which is caused also, for that their *Vital Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698

The *Insecta* Haue *Voluntary Motion*, and therefore *Imagination*; And whereas some of the *Ancients* haue said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently obserued; For *Ants* goe right forwards to their *Hills*; And *Bees* doe (admirably) know the way, from a Flowry Heath, two or three Miles off, to their *Hives*. It may be, *Gnats*, and *Flyes*, haue their *Imagination* more mutable, and giddy, as *Small Birds* likewise haue. It is said by some of the *Ancients*, that they haue onely the *Sense* of *Feeling*; which is manifestly untrue: For if they goe forth-right to a Place, they must needs haue

Sight:

Sight: Besides they delight more in one *Flower*, or *Herbe*, than in another, and therefore haue *Taste*: And *Bees* are called with *Saund* vpon *Grasse*, and therefore they haue *Hearing*: Which sheweth likewise that though their *Spirits* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Obseruations concerning the Insecta, together with the Enumeration of them, wee referre to that Place, where wee meane to handle the Title of Animal's in generall.

A *Man* *Leapest* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengthneth the *Muscles*, by *Contrailing* them. For otherwise, where no *Contraction* is needfull, *Weight* hindereth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, vpon the one *Horse*, more than vpon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater *Force*: For the *Hands* goe backward before they take their *Raife*. *Quere*, if the contrary *Motion* of the *Spirits*, immediately before the *Motion* wee intend, doth not cause the *Spirits*, as it were, to breake forth with more *Force*: As *Breath* also drawne, and kept in, cometh forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater *Swing*, are first cast backward.

Of *Musicall Tones*, and *Vnequall Sounds*, wee haue spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shinering* or *Horror* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and *Offence*. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memory* of *Things* that are *Odious*, or *Fearfull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharpe, or Flat, if they be Sweet, haue a *Roundnesse* and *Equality*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Diuers Sounds Meeting*. It is true, that *Inequality*, not Stayed vpon, but *Pfing*, is rather an *Encrease* of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucity* of a *Trumpet*; And in the *Nightingale-Pipe* of a *Regall*; And in a *Discord* straight falling vpon a *Concord*: But if you stay vpon it, it is *Offensiu*; And therefore, there bee these three *Degrees* of *Pleasuring*, and

Experiment
Solitary touching
Leaping.

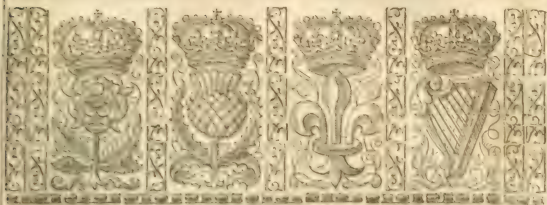
699

Experiment
Solitary, touching the
Pleasures, and Displeasures
of the Senses, especially
of Hearing.

700

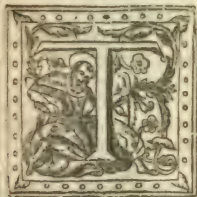
and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by diuers Names, as *Skriching*, or *Grating*, such as wee now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betwene the *Teeth*, and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betwene the *Teeth*, and *Striking* vpon the *String*.





NATVRALL HISTORIE.

VIII. Century.



Here be *Mineralls*, and *Fossiles*, in great Varie-
tie ; But of *Veines* of *Earth Medicinall*, but
few ; The Chiefe are, *Terra Lemnia*, *Terra*
Sigillata communis, and *Bolus Arminius* :
Whereof *Terra Lemnia* is the Chiefe. The
Vertues of them are, for *Curing* of *Wounds*,
Stanching of *Bloud*, *Stopping* of *Fluxes* and
Rheumes, and *Arresting* the *Spreading* of *Poi-*
son, *Infection*, and *Putrefaction* : And they
haue, of all other *Simples*, the *Perfected* and
Purest *Qualitie* of *Drying*, with little or no *Mixture* of any other *Qualitie*.
Yet it is true, that the *Bole-Arminicke* is the most *Cold* of them ; And that
Terra Lemnia is the most *Hot* ; For which Cause, the *Island Lemnos*, where
it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

About the *Bosome* of the *Straights* are gathered great *Quantities* of
Sponges, which are gathered from the *sides* of *Rocks*, being as it were a
large, but tough, *Mass*. It is the more to be noted, because that there be
but few *Substances*, *Plant* like, that grow deepe within the *Sea* ; For they
are gathered sometimes fiftene *Fathome* deepe ; And when they are laid

Experiment
Solitary tou-
ching *Veins*
of *Medicinall*
Earth.

701

Experiment
Solitary, tou-
ching the
Growth of
Sponges.

702

on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a very small Roome.

Experiment
Solitary touch-
ing Sea-Fish
put in Fresh
Waters.

703

It seemeth, that *Fish*, that are vsed to the *Salt-Water*, doe neuerthelesse delight more in *Fresh*. Wee see, that *Salmons*, and *Smelts*, loue to get into *Rivers*, though it be against the *Streame*. At the *Hauen* of *Constantinople*, you shall haue great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne vp their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Experiment* made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may haue them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into *Pits*, where the *Sea* goeth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes *Fatter*, and more *Growne*.

Experiment
Solitary, touch-
ing Attraction
by Similitude
of Substance.

704

The *Turkish-Bow* giueth a very Forcible *Shoot*; Insomuch as it hath beene knowne, that the *Arrow* hath pierced a *Steele Target*, or a *Peece* of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a *Peece* of *Wood*, of eight Inches thicke. And it is certaine, that wee had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, saue *Wood* sharpened; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce. But this dependeth vpon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the *Body* is wholly freed from the *Motion* of *Gravitie*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the helpe of the *Load-Stone*. But this same *Motion* of *Weights* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinitie with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, becommeth to shew it selfe. But wee shall handle this *Point* of *Nature* fully in due Place.

Experiment
Solitary, touch-
ing certaine
Drinckes in Tur-
key.

705

They haue in *Turkey*, and the *East*, certaine *Confections*, which they call *Sernetts*, which are like to *Candied Conserues*; And are made of *Sugar* and *Lemons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other *Flowers*; And some Mixture of *Amber* for the more delicate *Persons*; And those they dissolue in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much maruell, that no *Englishman*, or *Dutchman*, or *German*, doth set vp *Brewing* in *Constantinople*; Considering they haue such *Quantitie* of *Barley*. For as for
the

the generall Sort of *Men*, Frugalitie may be the Cause of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well be at the Cost. And yet I wonder the lesse at it, because I see *France*, *Italie*, or *Spaine*, haue not taken into vse, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gain to any, that should begin it in *Turkey*.

In *Bathing in Hot Water*, *Sweat* (neuertheless) commeth not in the Parts vnder the *Water*. The Cause is; First, for that *Sweat* is a Kinde of *Coagulation*. And that Kinde of *Coagulation* is not made, either by an *Ouer-Drie Heat*, or an *Ouer-Moist Heat*. For *Ouer-Moisture* doth somewhat extinguish the *Heat*; As wee see that euen *Hot Water* quenchereth *Fire*: And *Ouer-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* couered before the *Sunne*, or *Fire*, than if they stood Naked; And *Earthen Bottles*, filled with *Hot Water*, doe prouoke, in Bed, a *Sweat* more daintily, than *Bricke-bats Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those Parts vnder the *Water*, before it issueth in *Sweat*. Again, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The Cause is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physicians* may doe well, when they prouoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the lesse *Heated* first, and after halfe an *Houre* the more *Heated*.

Sweat is *Salt* in Taste; The Cause is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate*, and *Excerned*. *Bloud* also Raw hath some *Saltnesse*, more than *Flesh*; because the *Assimilation* into *Flesh*, is not without a little and subtil *Excretion* from the *Bloud*.

Sweat commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The Reason is, because those *Parts* are more replenished with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Dry*; As the *Forehead*, and *Breast*.

Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The Cause is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally moue inwards, and there rest. But when they are collected once within, the *Heat* becommeth more *Violent*, and *Irritate*; And thereby expelleth *Sweat*.

Cold Sweats are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The Cause is, for that *Cold Sweats* come by a *Relaxation* or *Forfaking* of the *Spirits*,

Experiments
in Comfort,
touching *Sweat*

706

707

708

709

710

Spirits, wherby the *Moisture* of the *Body*, which *Heat* did keepe firme in the *Parts*; *seuereth*, and *issueth* out.

711

In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it caleteth and *lightneth*; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the *Latter* Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the *Former*, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them *Oppressed*; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moueth to an *Expulsion* indifferent ouer all the *Body*.

Experiment
Solitary, touch-
ing the *Glo-
worme*.

712

The *Nature* of the *Glo-worme* is hitherto not well obserued. Thus much we see; That they breed chiefly in the *Hottest* *Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Wherby it may be conceiued, that the *Spirit* of them is very fine, and not to be refined, but by *Summer* *Heats*: And againe, that by reason of the *Fineness*, it doth easily exhale. In *Italy*, and the *Hottter* *Countries*, there is a *Fly* they call *Zucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying* *Glo-worme*. But that *Fly* is chiefly vpon *Fens*, and *Marri-
shes*. But yet the two former *Observations* hold; For they are not scene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greene* of the *Fens*, giue as good *Shade*, as *Bushes*. It may be the *Glo-wormes* of the *Cold* *Countries* ripen not so farre as to be *Winged*.

Experiments
in Consort,
touching the
Impressions,
which the *Pass-
ions* of the
Minde make
vpon the *Body*.

713

The *Passions* of the *Minde*, worke vpon the *Body* the *Impressions* following. *Feare* causeth *Paleness*; *Trembling*; The *Standing* of the *Haire* *vpright*; *Starting*; and *Scratching*. The *Paleness* is caused, for that the *Bloud* runneth inward, to succout the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward* *Parts* are destituted, and not sustained. *Standing* *vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth a-
slope, must needs Rise. *Starting* is both an *Apprehension* of the *Thing* *feared*; (And, in that kinde, it is a *Motion* of *Shrinking*;) And likewise an *Inquisition*, in the beginning, what the *Matter* should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any *Thing*, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Scratching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be vnprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* vpon *Paine*.

714

Griefe and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Disorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Rosring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Force*. And this is, when the *Spirits* yeeld, and giue over to resist; For if one doe constantly resist *Paine*, he will not groane. *Tearres* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Tearres* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell; Which maketh the *Parts* knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Swearing* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

Joy causeth a *Chearefulnessse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Tearres*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Liuely*, and *Stirring*. We know it hath beene seene, that *Excessive Sudden Joy*, hath caused *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Tearres*, they are the *Effects* of *Compression* of the *Moisture* of the *Braine*, vpon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Joy*, it worketh it diuerly; viz. by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupy more Roome.

Anger causeth *Palenessse* in some, and the *Going* and *Comming* of the *Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Palenessse*, and *Going*, and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselues call in more *Spirits* from the *Outward Parts*. And if the *Palenessse* be alone, without *Sending forth* the *Colour* againe, it is commonly ioyned with some *Feare*; But in many there is no *Palenessse* at all, but contrariwise *Rednesse* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Reuenge*. *Trembling* in *Anger* is likewise by a *Calling in* of the *Spirits*; And is commonly, when *Anger* is ioyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Ouer-Heating*, and by a *Liquesfaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Reuenge*.

Lights Displeasure or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horror* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a *Slow* and

Definite

715

716

717

Definite Trembling; And is a *Gesture* of *Slight Refusal*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which wee vse, when we refuse a Thing, or warne it away. The *Frowning*, and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow vpon earnest *Studying*, or *Cogitation* of any Thing, though it bee without *Dislike*.

718

Shame causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be scene in the whole *Breast*, if it be *Naked*, yet that is but in *Passage* to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reuerence* a *Man* beareth to other *Men*; Whereby, when he is ashamed, he cannot endure to looke firmly vpon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when we come before Many; *Ore Pompeij quid mollius? Nunquam non coram pluribus erubuit*: And likewise when we come before *Great*, or *Reuerend Persons*.

719

Pity causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye* aside. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pity* is but *Griefe* in Anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Auerfion*, or *Loathnesse* to behold the *Object* of *Pity*.

720

Wonder causeth *Astonishment*, or an *Immeasurable Posture* of the *Body*; *Casting vp* of the *Eyes* to *Heauen*; And *Lifting vp* of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* vpon one *Object* of *Cogitation*; whereby it doth not *spatiate* and *transcurre*, as it useth: For in *Wonder* the *Spirits* fly not, as in *Feare*; But onely settle, and are made lesse apt to moue. As for the *Casting vp* of the *Eyes*, and *Lifting vp* of the *Hands*, it is a *Kinde* of *Appeale* to the *Deity*; Which is the *Author*, by *Power*; and *Providence*, of *Strange Wonders*.

721

Laughing causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interiection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be *Violent*, and *Continued*. Wherein first it is to be vnderstood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there euer precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is *Proper* to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinity* with the *Passions* of the *Minde*,) it is moued, and that in great vehemency, onely by *Tickling* some *Parts* of the *Body*: And we see that *Men* euen in a *Griued State* of *Minde*, yet cannot sometimes forbear *Laughing*. Thirdly, it is euer ioyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinity* with *Ioy*, though it be a much *Lighter Motion*: *Res seuera est verum Gaudium*. Fourthly, that the *Object* of it is *Deformity*, *Absurdity*, *Shrew'd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall

Graves Notes give some Light. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expiration* of the *Breath* and *Face*, and *Shaking* of the *Breast* and *Vitals*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being *Sudden*. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we spake of the *Tears* of *Joy* and *Griefe*;) is an Effect of *Dilatation* of the *Spirits*. And for *Suddenness*, it is a great Part of the *Matter*: For we see, that any *Shrend Turne* that lighteth vpon Another; Or any *Deformity*, &c. moueth *Laughter* in the Instant; Which after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whilst it is *Now*: And euen in *Tickling*, if you *Tickle* the *Sides*, and giue warning; Or giue a *Hard* or *Continued Touch*, it doth not moue *Laughter* so much.

Lust causeth a *Flagrancy* in the *Eyes*; and *Prisipisme*. The Cause of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great Use may be made of the *Observation*;) that (euermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Feuerous Parts*: In *Foure*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*.

It hath beene observed by the *Ancients*, and is yet beleueed, that the *Sperme* of *Drunken Men* is *Fruitfull*. The Cause is, for that it is *Ouer-measured*, and wanteth *Spissitude*. And we haue a merry Saying, that they that goe *Drunke* to *Bed*, get *Daughters*.

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntary Motion*. They *Reele*; They *tremble*; They cannot stand, nor speake strongly. The Cause is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animal*, and occupate Part of the Place, where they are; And so make them *Weake* to moue. And therefore *Drunken Men* are apt to fall asleepe: And *Opistes*, and *Stupefactiues*, (as *Poppe*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantity* of the *Vapour*. Besides, they rob the *Spirits Animal* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey vpon it, as well as they: And so they make the *Spirits* lesse *Supple*, and *Apt* to moue.

Drunken Men imagine euery Thing turneth round; They imagine also that Things Come vpon them; They See not well Things a farre off; Those Things that they See neare hand, they See out of their Place; And (sometimes) they see Things double. The Cause of the Imagination that Things turne Round, is, for that the *Spirits* themselves turne, being compelled by the *Vapour* of the *Wine*: (For any *Liquid Body* vpon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* moue, or the *Object* moueth, or the *Medium* moueth. And we see that long *Turning Round* breedeth the same Imagination.

Experiments
in Confort
touching *Drunkennesse*.

723

724

725

The Cause of the Imagination that Things come upon them, is, for that the Spirits Visuall themselves draw backe; which maketh the Object seeme to come on; And besides, when they see Things turne Round, and Moue, Feare maketh them thinke they come vpon them. The Cause that they cannot see Things a farre off, is the Weaknesse of the Spirits; for in euery *Megrim*, or *Vertige*, there is an *Obtuse* or *Obscuration* ieyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swoonings*. The Cause of Seeing things out of their Place, is the Refraction of the Spirits Visuall; For the *Vapour* is as an *Inequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The Cause of Seeing Things double, is, the *Swift* and *Inquiet Motion* of the Spirits, (being Oppressed,) to and fro; For, (as was said before,) the Motion of the Spirits Visuall, and the Motion of the Object, make the same Appearances; And for the *Swift Motion* of the Object, we see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

726

Men are sooner Drunke with Small Draughts, than with Great. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The Cause of the Former is, for that the *Wine* descendeth not so fast to the Bottom of the *Stomach*; But maketh longer Stay in the Upper Part of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops in Wine*, (Quantity for Quantity,) inebriate more, than *Wine* of it selfe. The Cause of the Latter is, for that the *Sugar* doth inspissate the Spirits of the *Wine*, and maketh them not so easie to resoluē into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken vpon much *Drinking*.

Experiment
Solitary touch-
ing the Helpe
or Cure of
Wine, though
Minerally sed.

727

The Use of *Wine*, in *Dry*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The Cause is, for that the Spirits of the *Wine* doe prey vpon the *Dew*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceue the *Animall Spirits*. But where there is *Moisture* Enough, or *Superfluous*, there *Wine* helpeth to digest, and defecate the *Moisture*.

Experiment
Solitary touch-
ing Caterpillers.

728

The *Catterpillar* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaues*: For we see infinite Number of *Catterpillers*, which breed vpon *Trees*, and *Hedges*; By which the *Leaues* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding vpon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* haue much blowne: The Cause whereof is, the *Driness* of that *Wind*: For to all *Finification* vpon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they haue *Copwells* about them, which is a signe of a *Slimy Driness*: As we see vpon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwells* breed all ouer.

We

We see also the *Greene Caterpillar* breedeth in the Inward Parts of *Ros-es*, especially not blowne, where the *Dew* sticketh: But especially *Caterpillers*, both the greatest, and the most, breed vpon *Cabbages*, which haue a *Fat Lease*, and apt to *Patrisfe*. The *Caterpillar* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps some other *Fly*. There is a *Caterpillar*, that hath a *Furze*, or *Dawne* vpon him, and seemeth to haue *Affinity* with the *Silke-worme*.

The *Flyes Cantharides* are bred of a *Worme*, or *Caterpillar*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosiue*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersiue*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no maruell though *Cantharides* haue such a *Corrosiue*, and *Cauterizing Quality*; For there is not any other of the *Insecta*, but is bred of a *Durser Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate-coloured *Dragon-Flies*, may haue likewise some *Corrosiue Quality*.

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warm water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* giue a *Relaxation*, or *Emolliation*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by *Chearing* or *Comforting* of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so discharge *Wearinesse*; as *Sleepe* likewise doth.

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Life* of the *Feet*, when a Man *Goeth up the Hill*, the *Weight* of the *Body* beareth most vpon the *Knees*; And in *Going downe the Hill*, vpon the *Thighes*.

The *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaching* of the *Secundine*, or *Call*; but not rightly: For that were to make euery *Casting* of the *Skin* a *New Birth*: And besides, the *Secundine* is but a generall *Couer*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard*, the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crawfish*, the *Hodman-dod* or *Dodman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* neuer: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the *Extreme Tendernesse* and *Sofnesse*

Experiment
Solitary, touch-
ing the *Flyes*
Cantharides.

729

Experiments
in Comfort,
touching *Lassi-
tude*.

730

731

Experiment
Solitary touch-
ing the *Cast-
ing* of the *Skin*,
and *Shell*, in
some *Creatures*.

732

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colours* of it. The *Cause* of the *Casting of Skin, and Shell*, shew'd seen to be the great *Quantity* of *Matter* in those *Creatures*, that is fit to make *Skin, or Shell*. And againe, the *Loosenesse* of the *Skin, or Shell*, that sticketh not close to the *Flesh*. For it is certaine that it is the *New Skin, or Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that haue much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments
in Comfort
touching the
Postures of the
Body.

733

Lying, not *Erect*, but *Hollow*, which is in the Making of the *Bed*; Or with the *Legges gathered up*, which is in the *Posture* of the *Body*, is the more *Wholesome*. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse *Pensile*: And we see, that in *Wake Stomachs*, the *Laying up* of the *Legs* high, and the *Knees* almost to the *Mittles*, helpeth, and comforteth. We see also that *Gally-Slaues*, notwithstanding their *Misery* otherwise, are commonly *Fat and Fleishy*; And the *Reason* is, because the *Stomach* is supported somewhat in *Sitting*; And is *Pensile* in *Standing*, or *Going*. And therefore, for *Prolongation of Life*, it is good to choose those *Exercises*, where the *Limbs* moue more than the *Stomach*, and *Belly*; As in *Rowing*, and in *Sawing* &c.

734

Megrims and *Giddinesse* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the *Sudden Motion*, fly more vp to the *Head*.

735

Leaning long vpon any *Part* maketh it *Namme*, and, as wee call it, *Asleepe*. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to haue free *Access*; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Experiment
Solitary, touch-
ing *Pestilentiall*
Yeares.

736

It hath beene noted, that those *Yeares* are *Pestilentiall*, and *Unwholesome*, when there are great *Numbers* of *Frogs*, *Flies*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment
Solitary, touch-
ing the *Prig-
nossticks* of *Hard*
Winners.

737

It is an *Obseruation* amongst *Country-People*, that *Yeares* of *Store* of *Hawes* and *Heps*, doe commonly portend *Cold Winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preseruation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Lack* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Frosts*, and must needs leaue great *Quantity* of *Cold Vapours*,

cours, not dissipate ; Which causeth the *Cold* of the *Winter* following.

They haue in *Turkey*, a *Drinke* called *Coffa*, made of a *Berry* of the same Name, as *Blacke* as *Saet*, and of a *Strong Sent*, but not *Aromaticall* ; Which they take, beaten into *Powder*, in *Water*, as *Hot* as they can drinke it : And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Brain*, and *Heart*, and helpeth *Digestion*. Certainly this *Berry Coffa* ; The *Root*, and *Leafe Betel* ; The *Leafe Tobacco* ; And the *Tear* of *Poppy*, (*Opium*;) of which the *Turkes* are great *Takers*, (supposing it expelleth all *Feare*;) doe all *Condensate the Spirits*, and make them *Strong*, and *Aleger*. But it seemeth they are taken after severall manners ; For *Coffa* and *Opium* are taken downe ; *Tobacco* but in *Smoke* ; And *Betel* is but *champed* in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quere* of *Henbane-Seed* ; Of *Mandrake* ; Of *Saffron*, *Root*, and *Flower* ; Of *Folium Indum* ; Of *Amber-grice* ; Of the *Affryan Amomum*, if it may be had ; And of the *Scarlet Powder*, which they call *Kermex* ; And (generally) of all such Things, as doe inebriate, and prouoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible euer than *Leaues*.

Experiment
Solitary touch-
ing *Meli-*
cines that *Con-*
dense, and *Re-*
leue the *Spirits*.

738

The *Turke* haue a *Blacke Powder*, made of a *Minerall* called *Alcobole* ; Which with a fine long *Pencil* they lay vnder their *Eye lids*, Which doth colour them *Blacke* ; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into *Embowed Arches*. You shall finde that *Xenophon* maketh *Mention*, that the *Medes* vsed to paint their *Eyes*. The *Turke* vs with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beard*. *Blacke* : And diuers with vs, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* *blacke*, by *Combing* it, (as they say,) with a *Leaden Combe*, or the like. As for the *Chinejes*, who are of an ill *Complexion*, (being *Oliuaster*;) they paint their *Cheekes* *Scarlet* ; Especially their *King*, and *Grandes*. Generally, *Barbarous People*, that goe *Naked*, doe not onely paint *Themselves*, but they pounce and raze their *Skinne*, that the *Painting* may not be taken forth ; And make it into *Works*. So doe the *West Indians* ; And so did the *Ancient Pitts*, and *Brittons* ; So that it seemeth, *Men* would haue the *Colours* of *Bird Feathers*, if they could tell how ; Or at least, they will haue *Gay Skins*, in stead of *Gay Cloathes* ;

Experiment
Solitary, tou-
ching *Paintings*
of the *Body*.

739

It is strange, that the *Vse* of *Bathing*, as a *Part* of *Diet*, is left. With the *Romans*, and *Grecians*, it was as vsuall, as *Eating*, or *Sleeping* : And so is it amongst the *Turkes* at this day : Whereas with vs it remaineth but as a *Part* of *Physicke*. I am of *Opinion*, that the *Vse* of it, as it was with the *Romans*, was hurtfull to *Health* ; For that it made the *Body* *Soft*, and easie to *Waste*. For the *Turkes* it is more proper, because that their *Drink-*

Experiment
Solitary, tou-
ching the *Vse*
of *Bathing* and
Amouring.

740

king

king Water, and Feeding vpon *Rize*, and other Food of small Nourishment, maketh their *Bodies* so Solide, and Hard, as you need not feare that *Bathing* should make them *Froathie*. Besides, the *Turkes* are great *Sitters*, and seldome walke; Whereby they Sweat lesse, and need *Bathing* more. But yet certaine it is, that *Bathing*, and especially *Annointing*, may be so vsed, as it may be a great Helpe to *Health*, and *Prolongation* of *Life*. But hereof we shall speake in due Place, when we come to handle *Experiments Medicinall*.

Experiment
Solitary, touching
Chamo-
letting of Paper.

741

The *Turkes* have a Pretty Art of *Chamoletting* of *Paper*, which is not with vs in vsē. They take diuers *Oyled Colours*, and put them seuerally (in drops) vpon *Water*; And stirre the *Water* lightly; And then wet their *Paper*, (being of some *Thicknesse*;) with it; And the *Paper* will be *Waued*, and *Veined*, like *Chamolet*, or *Marble*.

Experiment
Solitary, touching
Cuttle-
Inke.

742

It is somewhat strange, that the *Bloud* of all *Birds*, and *Beasts*, and *Fishes*, should be of a *Red Colour*, and only the *Bloud* of the *Cuttle* should be as *Blacke* as *Inke*. A Man would thinke, that the *Cause* should be the *High Concoction* of that *Blond*; For wee see in ordinary *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Request.

Experiment
Solitary, touching
Encrease
of weight in
Earth.

743

It is reported of Credit, that if you take *Earth*, from Land adioyning to the *Riuer* of *Nile*; And preserve it in that manner, that it neither come to be *Wet*, nor *Wasted*; And Weigh it daily, it will not alter *Weight* vntill the seuenteenth of *June*, which is the Day when the *Riuer* beginneth to rise; And then it will grow more and more *Ponderous*, till the *Riuer* commeth to his Height. Which if it be true, it cannot be caused, but by the *Aire*, which then beginneth to Condense; And so turneth within that Small *Mould* into a degree of *Moisture*; Which produceth *Weight*. So it hath beene obserued, that *Tobacco*, Cut, and Weighed, and then Dried by the Fire, loseth *Weight*; And after being laid in the open *Aire*, recouereth *Weight* againe. And it should seeme, that as soone as euer the *Riuer* beginneth to increase, the whole *Body* of the *Aire* thereabouts suffereth a Change: For (that which is more strange,) it is credibly affirmed, that vpon that very Day, when the *Riuer* first riseth, great *Plagues*, in *Cairo*, vse suddenly to breake vp.

Experiments
in Comfort,
touching
sleep.

744

Those that are very *Cold*, and especially in their *Feet*, cannot get to *Sleepe*. The *Cause* may be, for that in *Sleepe* is required a *Free Respiration*, which *Cold* doth shut in, and hinder: For wee see, that in great *Colds*, one can scarce draw his *Breath*. Another *Cause* may be, for that *Cold* calleth the *Spirits* to succour; And therefore they cannot so well close, and goe together in the *Head*; Which is euer requisite to *Sleepe*. And for the same *Cause*, *Paine*, and *Noise* hinder *Sleepe*; And *Darknesse* (contrariwise) furthereth *Sleepe*.

Some

Some *Noises* (whereof wee spake in the 112. Experiment) helpe *Stoie*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming*, of *Bees*, *Soft Singing*, *Reading*, &c. The Cause is, for that they move in the *Spirits* a gentle *Attention*; And whatsoever moueth *Attention*, without too much Labour, stilleth the Naturall and discursive *Motion* of the *Spirits*.

Sleepe nourisheth, or at least preserveth *Bodies*, a long time, without other *Nourishment*. *Bees* that sleepe in *Winter*, (as it is noted of *Wilde Beares*) during their *Sleepe* wax very Fat, though they Eat nothing. *Bats* have bene found in *Ovens*, and other Hollow Close Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *Winter* time, and eat Nothing. *Quere*, whether *Bees* doe not *Sleepe* all *Winter*, and spare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Darmouse*, both *Winter* and *Summer*, will *Sleepe* some dayes together, and eat Nothing.

To restore *Teeth* in *Age*, were *Mignale Naturæ*. It may be thought of. But howsoever the *Nature* of the *Teeth* deterueth to be enquired of, as well as the other *Parts* of *Living Creatures Bodies*.

There be *Fine Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Substance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; and the *Nails*. The greatest *Quantity* of *Hard Substance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillary Bones*; There is the *Hard Bone*, that is the *Instrument* of *Hearing*; And thence issue the *Hornes*: So that the *Building* of *Living-Creatures Bodies*, is like the *Building* of a *Timber-House*, where the *Walls*, and other *Parts* haue *Columns*, and *Beames*; But the *Roofe* is, in the better Sort of *Houses*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they haue Three other *Hard Substances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* haue *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Nail*. But no *Living-Creatures*, that haue *Shells* very hard; (As *Oysters*, *Cockles*, *Mussels*, *Scallops*, *Crabs*, *Lobsters*, *Crawfish*, *Shrimps*, and especially the *Tortoise*.) haue *Bones* within them, but onely little *Gristles*.

Bones, after full Growth, continue at a Stay: And so doth the *Skull*: *Hornes*, in some *Creatures*, are cast, and renewed: *Teeth* stand at a Stay except their *Wearing*: As for *Nails*, they grow continually: And *Bills* and *Beaks* will over-grow, and sometimes be cast; as in *Eagles*, and *Parrots*.

Most of the *Hard Substances* lye to the *Extremes* of the *Body*; As *Skull*, *Hornes*, *Teeth*, *Nails*, and *Beaks*: Onely the *Bones* are more *Inward*, and clad with *Flesh*. As for the *Entrailes*, they are all without *Bones*; Saue that a *Bone* is (sometimes) found in the *Heart* of a *Stag*; And it may be in some other *Creature*.

Experiments
in Confort,
touching Teeth
and Hard Sub-
stances in the
Bodies of Living
Creatures.

745

746

747

748

749

The

750

The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back Bone* hath one Kinde of *Marrow*, which hath an Affinity with the *Braine*; And other *Bones* of the *Body* haue another. The *Law-Bones* haue no *Marrow* Seuered, but a little *Pulpe* of *Marrow* diffused. *Teeth* likewise are thought to haue a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Blond*. *Horne* is alike throughout; And so is the *Nail*.

751

None other of the *Hard Substances* haue *Sense*, but the *Teeth*: And the *Teeth* haue *Sense*, not onely of *Paine*, but of *Cold*.

But we will leaue the Enquiries of other *Hard Substances*, vnto their severall Places; And now enquire onely of the *Teeth*.

752

The *Teeth* are, in *Men*, of three Kindes: *Sharpe*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betwene both. But there haue bene some *Men*, that haue had their *Teeth* undivided, as of one whole *Bone*, with some little Marke in the Place of the Division; As *Pyrhus* had. Some *Creatures* haue *Ouer-long*, or *Ouer-growing Teeth*, which wee call *Fangs*, or *Tukes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs*; though lesse. Some *Living Creatures* haue *Teeth* against *Teeth*; As *Men*, and *Horses*; And some haue *Teeth*, especially their *Master-Teeth*, indented one within Another, like *Naves*; As *Lions*; And so againe haue *Dogs*. Some *Fishes* haue diuers *Rowes* of *Teeth* in the *Roofes* of their *Mouthes*; As *Pikes*, *Salmons*, *Trauts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents*, haue *Venomous Teeth*; which are sometimes mistaken for their *Sting*.

753

No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* aboue, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet be conuerse; For *Doe's*, that haue no *Hornes*, haue no *Vpper Teeth*.

754

Horses haue, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there cometh the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, euery yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; That the *Marke* is out of the *Horses Mouth*.

755

The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seuen yeares old. But diuers haue *Backward-Teeth* come forth at *Twenty*, yea some at *Thirty*, and *Forty*. *Quere* of the manner of the *Comming* of them forth. They tell a *Tale* of the old *Countesse* of *Desmond*, who liued till she was seuen-score yeares old, that she did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others *Comming* in their Place.

756

Teeth are much hurt by *Sweet-Meats*; And by *Paining* with *Mercury*; And by *Things Ouer-hot*; And by *Things Ouer-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

Concerning *Teeth*, these Things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* is of *Artificials Teeth*, where *Teeth* have beene stricken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that giue any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quare* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to haue beene prouoked by *Art*; Therefore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than vsuall; As to make an *Oxe*, or a *Deere*, haue a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and prouoked. It may be tryed also, whether *Birds* may not haue some thing done to them, when they are *Young*, wherby they may be made to haue *Greater*, or *Longer Bills*; Or *Greater* and *Longer Talions*? And whether *Children* may not haue some *Wash*, or Some thing to make their *Teeth* *Better*, and *Stronger*? *Corall* is in vse as an *Helpe* to the *Teeth* of *Children*.

Some *Living Creatures* generate but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domesticke Creatures*; As *Horses*, *Hogges*, *Dogges*, *Cats*, &c. The *Cause* of *Generation* at all *Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plenty* of *Food*. For the first, *Men*, *Horses*, *Dogges*, &c. which breed at all *Seasons*, are full of *Heat*, and *Moisture*; *Doies* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearfulnesse*; and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparifon of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going to Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to *Rut* somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at cer-

Experiments
in Confort,
touching the
Generation and
Bearing of Li-
ving Creatures
in the Wombe.

758

tainc *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* preparcth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of *Generation*: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by *Experience*, that if you take the *Egges*, or *Young Ones*, out of the *Nests* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759

Of *Living Creatures*, some are *Longer time* in the *Wombe*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six *Moneths*; *Doe's* goe about nine *Moneths*; *Mares* eleuen *Moneths*; *Bitches* nine *Weekes*; *Elephants* are said to goe two *Yeares*; For the Received *Tradition* of ten *Yeares* is *Fabulous*. For *Birds* there is double *Enquiry*; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diversity* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three *Weekes*; The *Turky-Hen*, *Goose*, and *Ducke*, a *Moneth*; *Quare* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Wombe*. For the former, those that are longer in *Commig* to their *Maturity* or *Growth*, are longer in the *Wombe*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Wombe*, are long time in *Commig* to their full *Growth*. But in most other *Kindes*, the *Constitution* of the *Wombe*, (that is, the *Hardnesse* or *Driness* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure *yeares* of *Growth*; And so the *Fawne*; And so the *Calse*. But *Whelps*, which come to their *Growth* (commonly) within three *Quarters* of a *yeare*, are but nine *Weekes* in the *Wombe*. As for *Birds*, as there is lesse *Diversity*, amongst them, in the time of their *Bringing forth*; So there is lesse *Diversity* in the time of their *Growth*; Most of them comming to their *Growth* within a *Twelve-Moneth*.

760

Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *Women*, *Lionesses*, &c. This may be caused, either by the *Quantity* of *Sperme* required to the *Producing* One of that *Kinde*; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Wombe*, which may sever the *Sperme*.

Experiments
in Consort,
touching *Species* *Fish*ble.

761

There is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottom* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottom* of the *Water*. I have heard of a *Practise*, that *Glow-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* diueth, having his *Eyes* open, and swimmeth vpon his

Backe;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

It would be well boulded out, whether great *Refractions* may not be made vpon *Reflexions*, as well as vpon *Direct Beames*. For Example, We see that take an *Empty Basen*, put an *Angell* of Gold, or what you will, into it; Then goe so farre from the *Basen*, til you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Basen* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Basen* of *Water*, I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beauty*, and *Strangenesse*, were a fine Proove: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Ceferne* or *Poole* of *Water*, you shall place ouer against it a *Piſture* of the *Deuill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *Water*: Now if you can see the *Deuills Piſture* aside, not seeing the *Water*, it will looke like a *Deuill* indeed. They haue an old Tale in *Oxford*, that *Friar Bacon* walked betweene two *Steeple*s: Which was thought to be done by *Glasses*, when he walked vpon the *Ground*.

A *Weighty Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpor* of *Solide Bodies*; Which beside their *Motion* of *Gravity*, haue in them a *Naturall Appetite*, not to moue at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* vpon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more *Force* to be put in *Motion*. For if a *Weighty Body* be Penfile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* very neare as easily, as if it were already in *Motion*.

A *Body* *Over-great*, or *Over-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moued*, and the *Force*, to make it moue well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moueth*, and the *Resistance* of the *Body* that is *Moued*: And if the *Body* be too great, it yeeldeth too little; And if it be too small, it resisteth too little.

It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid vpon a *Body*, as *Falling*, or *strucken* from aboue. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moued*, haue by *Impulsion*, or by the *Motion* of *Gravity continued*, a *Compression* in them, as well downwards, as they haue when they are throwne, or *Shot thorow the Aire*,

762

Experiments
in Confort,
touching Im-
pulsion, and Per-
cussion.

763

764

765

forwards. I conceiue also, that the quicke *Loose* of that *Motion*, preuenteth the *Resistance* of the *Body* below; And *Priority* of the *Force*, (alwaies,) is of great *Efficacy*; As appeareth in infinite *Instances*.

Experiment
Solitary, touch-
ing *Ticulation*.

766

Tickling is most in the *Soles* of the *Feet*, and vnder the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinness* of the *Skin* in those *Parts*; Ioynd with the *Rareness* of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinness* of the *Skin*, and *Suddenness*, and *Rareness* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddenness*; We see no *Man* can tickle himselfe: Wee see also, that the *Palm* of the *Hand*, though it hath as *Thinne* a *Skin*, as the other *Parts* Mentioned, yet is not *Ticklish*, because it is accustomed to be Touched. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Ticulation*; For vpon *Tickling*, we see there is euer a *Starting*, or *Shrinking* away of the *Part*, to auoid it; And we see also, that if you *Tickle* the *Noshrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is euer *Painfull*, and not well endured.

Experiment
Solitary, touch-
ing the Scar-
city of *Raine* in
A. pp.

767

It is strange, that the *Riuer* of *Nilus*, Ouer-flowing, as it doth, the *Country* of *Egypt*, there should be neuertheless little or no *Raine* in that *Country*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either vnto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* vpon the *Fire* doe vapour so much, after some time of *Boyl- ing*, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in *Taste*; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Country* of a *Hot Climate*, and flat, without *Shade*, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs haue great Power to *Concoct* it. As for the *Aire*, (from whence I conceiue this Want of *Showers* commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirsty*; And as soone as euer it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment
Solitary, touch-
ing *Clarification*.

768

It hath bene touched in the *Title* of *Perculations*, (Namely such as are *Inwards*;) that the *Whites* of *Eggs*, and *Milke*, doe *clarifie*; And it is certaine, that in *Egypt*, they prepare and *clarifie* the *Water* of *Nile*, by putting it into great *Jarres* of *Stone*, and *Stirring* it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Pestle*: And so draw it off, after it hath rested some time. It were good, to tye this *Clarifying* with *Almonds*, in New Beere, or *Must*, to hasten, and perfect the *Clarifying*.

There be scarce to be found any *Vegetables*, that haue *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Deserts* of *S. Matris* in *Agypt*, a Plant which is Long, Leauelesse, Browne of Colour, and Branched like *Corall*, saue that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts haue a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliueraunce*.

Experiment
Solitary touch-
ing Plants
without Leaves

769

The *Cryalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pania*, by the *Riuer Ticinum*; And the *Asbes* of a *Wood* called by the *Arabs Kall*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Egyptians* vsed first for *Fuell*; And then they crush the *Asbes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-workes*.

Experiment
Solitary, touch-
ing the Ma-
terials of Glasse.

770

It is strange, and well to be noted, how long *Carcaffes* haue continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Egypt*; Having lasted, as is conceiued, (some of them,) three thousand yeeres. It is true, they finde Meanes to draw forth the *Brains*, and to take forth the *Entrailles*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For wee see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which we conceiue to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that *Haste* to *Corruption*, that is conceiued. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Siluer*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved very long. It need not goe for *Repetition*, if we resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be excluded; For that vndermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body* *Adiacent* and *Ambient* be not *Commateriall*, but meerely *Heterogeneall* towards the *Body* that is to be preserved: For if Nothing can be received by the One, Nothing can issue from the Other, Such are *Quick-Siluer*, & *White-Amber*, to *Herbs*, and *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no *Part* of it issue into the *Body* *Adiacent*: And therefore it must be rather *Thinne*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is;

Experiment
Solitary touch-
ing Prohibition
of Putrefaction, and the
Long Conservation
of Bodies.

771

That

That if the *Body* to be preferued be of *Bulke*, as a *Corps* is, then the *Body* that Incloseth it, must haue a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had beene but newly Written; being written in *Parchment*, and couered ouer with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Egyptians* were; Which was the *Cause* that the *Body* was vtterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Caesar* visited the *Sepulchre* of *Alexander the Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Cesar* touching but the *Nose* of it, defaced it. Which makerh mee finde it very strange, that the *Egyptian Mummies* should be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Egyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised vpon the *Body* of *Alexander*.

Experiment
Solitary, touch-
ing the *Abund-
ance* of *Ni-
tre* in certaine
Sea-Shores.

772

Neare the *Castle* of *Catie*, and by the *Wells* of *Affan*, in the *Land* of *Idumca*, a great Part of the *Way*, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, vpon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Experiment
Solitary, touch-
ing *Bodies*
that are borne
vp by *Water*.

773

The *Dead-Sea*, which vomiteth vp *Bitumen*, is of that *Crafsitude*, as *Liuing Bodies* bound Hand and Foot, cast into it, haue beene borne vp, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Over-Weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heauy, of *Quicke-Siluer*, (perhaps,) or the like, as may beare vp *Iron*: Of which I see no Vse, but Impos- ture. Wee see also, that all *Metalls*, except *Gold*, for the same reason, swimme vpon *Quicke-Siluer*.

Experiment
Solitary, touch-
ing *Fuell*,
that consumeth
little, or nothing.

774

It is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make *Fires*,) which burneth like a *Coale*, and diminisheth not; But only waxeth Brighter, and Whiter. That it should doe so, is not strange; For wee see *Iron* Red Hot burneth, and consumeth not: But the Strangenesse is, that it should continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-waies. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuel*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamananders Wool*; Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *Weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wicke* not burne.

Sea-Coale last longer than *Char-Coale*; And *Char-Coale* of *Roots*, being coaled into great *Peeces*, last longer than Ordinary *Char-Coale*. *Turfes*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred vpon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuel* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that Mixture be, as the *Sea-Coale-Men* vse it, priuily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be vsed purposely, and be made knowne, it is Sauing.

It is, at this Day, in vse, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Deuice for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italie*, and *Spaine*, for *Freshnesse*, and Gathering the *Winds*, and *Aires*, in the Heats of *Summer*. But they be but *Pennings* of the *Winds*; and Enlarging them againe, and Making them *Reuerberate*, and goe round in *Circles*, rather than this Deuice of Spouts in the *Wall*.

There would be vsed much diligence; in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discouer the *Wholesomenesse* or *Unwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Constitutes*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Pece* of *Raw Fleish*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discouerie*; For they serue for a *Naturall Dimination* of *Seasons*; Better than the *Astronomers* can by their *Figures*. And againe, they teach Men where to chuse their *Dwelling*, for their better *Health*.

There is a Kinde of *Stone*, about *Berbleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them

Experiment
Solitary Occo-
nomical touch-
ing Cheape
Fuell.

775

Experiment
Solitary, touch-
ing the Gas-
tbering of Wind
for Freshnesse.

776

Experiment
Solitary touch-
ing the Tri-
als of Aires.

777

Experiment
Solitary touch-
ing Increa-

giue

Experi-
ment
Solitary, touch-
ing the Nature of
Milke-Beefts.

778

giue more *Milke*. Surely, there would be some better *Trialls* made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment
Solitary, touch-
ing the Nature of
Glasfe.

779

It is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most *Affinitie* with *Glasfe*; In-
somuch as other *Mineralls*, laid in it, turne to a *Glasfe Substance*, with-
out the *Fire*; And againe *Glasfe* put into it, turneth into the *Mother-Sand*.
The Thing is very strange, if it be true: And it is likeliest to be Caused by
some *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not speake
of any *Eruption* of *Flames*. It were good to trie in *Glasfe-Workes*, whe-
ther the *Crude Materialls* of *Glasfe*, mingled with *Glasfe*, already made, and
Re-moulten, doe not facilitate the *Making* of *Glasfe* with lesse *Heat*.

Experiment
Solitary, touch-
ing the
Growth of
Corall.

780

In the *Sea*, vpon the *South-West* of *Sicilie*, much *Corall* is found. It is
a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth only when it is vn-
der *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the
Aire, it becommeth *Hard*, and *Shining Red*, as wee see. It is said also,
to haue a *White Berry*; But wee finde it not brought ouer with the *Corall*.
Belike it is cast away as nothing worth: Inquire better of it, for the *Dis-
couerie* of the *Nature* of the *Plant*.

Experiment
Solitary, touch-
ing the
Gathering of
Manna.

781

The *Manna* of *Calabria* is the best, and in most *Plenty*. They gather
it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*,
as grow in the *Valley's*. And *Manna* falleth vpon the *Leaves* by *Night*, as
other *Deawes* doe. It should seeme, that before those *Deawes* come vpon
Trees in the *Valley's*, they dissipate, and cannot hold out. It should
seeme also, the *Mulberry-Leafe*, it selfe, hath some *Coagulating Vertue*,
which inspissateth the *Deaw*, for that it is not found vpon other *Trees*:
And wee see by the *Silke-Worme*, which feedeth vpon that *Leafe*, what a
Dainty Smooth Iuyce it hath; And the *Leaves* also, (especially of the
Blacke Mulberry,) are somewhat *Bristly*, which may helpe to preserue
the *Deaw*. Certainly, it were not amisse, to obserue a little better, the
Deawes that fall vpon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it
may be, many *Deawes* fall, that spend before they come to the *Valleys*.
And I suppose, that he that would gather the best *May-Deaw* for *Medi-
cine*, should gather it from the *Hills*.

Experiment
Solitary, touch-
ing the Cor-
recting of Wine.

782

It is said, they haue a manner, to preparte their *Greece-Wines*, to keepe
them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*:
Whereof the one is *Vinctuous*, and the other is *Astringent*. And certaine it
is, that those two *Natures* doe best repress *Fumes*. This *Experiment*
would be tr^{ans}ferred, vnto other *Wine*, and *Strong Beere*, by Putting in
some like *Substances*, while they worke; Which may make them both
to *Fume* lesse, and to *Inflame* lesse.

It is conceiv'd by some, (not improbably,) that the reason, why *Wilde Fires*, (Wherof the principall Ingredient is *Bitumen*;) doe not quench with *Water*, is, for that the first *Concretion* of *Bitumen* is a *Mixture*, of a *Fiery*, and *Watry Substance*: So is not *Sulphur*. This appeareth, for this in the *Place* neare *Puteoli*, which they call the *Court of Vulcan*, you shall heare, vnder the *Earth*, a Horrible Thundring of *Fire*, and *Water*, confounding together: And there breake forth also *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Etna*, and *Vesuvius*, and the like, which consist vpon *Sulphur*, shoot forth *Smoke*, and *Ashes*, and *Pumice*, but no *Water*. It is reported also, that *Bitumen* Mingled with *Lime*, and Put vnder *Water*, will make, as it were, an *Artificiall Rocke*; The *Substance* becommeth so Hard.

There is a *Cement*, compounded of *Floure*, *Whites of Egges*, and *Stone powdered*, that becommeth Hard as *Marble*; wherewith *Piscina mirabilis*, neare *Cuma*, is said to haue the *Walls Plastered*. And it is certaine, and tried, that the *Powder* of *Lead-Stone*, and *Flint*, by the Addition of *Whites of Egges*, and *Gumm-Dragon*, made into *Paste*, will in a few dayes harden to the Hardnesse of a *Stone*.

It hath bene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Fleers* or *Hurts* in the *Leggs*, are Hard to Cure; And in the *Head* more Easie. The *Cause* is, for that *Fleers* or *Hurts* in the *Leggs* require *Desiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Fleers* in the *Head* require it not; But contrariwise *Drincke* maketh them more apt to Consolidate. And in *Moderne Observation*, the like difference hath bene found, betwene *French-Men*, and *English-Men*; Whereof the ones *Constitution* is more *Dry*, and the others more *Moist*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *English-Man*.

It hath bene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cause a *Fenourous Disposition* of the *Yeare*; But with *Raine*, not. The *Cause* is, for that *Southerne Winds* doe, of themselves, qualifie the *Aire*, to be apt to cause *Feuers*; But when *Showers* are ioyned, they doe Refrigerate in Part, and Checke the Sultry Heat of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coasts*, because the *Vapour* of the *Sea*, without *Showers*, doth refresh.

It hath bene noted by the *Ancients*, that *Wounds* which are made with *Brasse*, heale more easily, than *Wounds* made with *Iron*. The *Cause* is, for that *Brasse* hath, in it selfe, a *Sanative Vertue*; And so in the very Instant helpeth somewhat: But *Iron* is *Corrosiue*, and not *Sanative*. And therefore it were good, that the Instruments which are vsed by *Chirurgians* about *Wounds*, were rather of *Brasse*, than *Iron*.

Experiment
Solitary touch-
ing the Ma-
nners of Wind-
Fire.

783

Experiment
Solitary, touch-
ing *Piscin*
growing as
hard as *Marble*.

784

Experiment
Solitary touch-
ing Iudg-
ment of the
Cure in some
Fleers and
Hurts.

785

Experiment
Solitary, touch-
ing the
Healthiness
or Unhealthi-
ness of the
Southerne Wind.

786

Experiment
Solitary, touch-
ing *Wounds*.

787

Experiment
Solitary touch-
ing Mortifi-
cation by Cold.

788

In the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a *Fire*, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put vpon them, helpeth; For that it preferueth those *Spirits* that remaine, till they can reuiue; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proued out of the *Text*; *Qui dat Nivem sicut Lannam, Gelu sicut Cincres spargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Asbes*. *Warne Water* also doth good, Because by little and little it openeth the Pores, without any sudden Working vpon the *Spirits*; This *Experiment* may be transferred vnto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to Things that are *Refrigerant*, with an *Inward Warmth*, and *Vertue* of Cherishing.

Experiment
Solitary touch-
ing Weight.

789

Weigh *Iron*, and *Aqua Fortis*, severally; Then dissolue the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deale of *Wast*, by a thicke *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Error*, in the *Triall*.

Experiment
Solitary touch-
ing the Sup-
per-Natation of
Bodies.

790

Take of *Aqua-Fortis* two Ounces, of *Quick-silver* two *Drachmes*; (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Antmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *EGge*. And I remember well a *Physitian*, that vsed to giue some *Minerall Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in *Ordinary Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment
Solitary, touch-
ing the Flying
of Inequall Bo-
dies in the Aire.

791

Let there be a *Body* of *Inequall Weight*; (As of *Wood* and *Lead*, or *Boue* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be *Forwards*; Vnlesse the *Body* be *Ouer-long*. The *Cause* is, for that the more *Dense Body*, hath a more *Violent Pressure* of the *Parts*, from the first *Impulsion*; Which is the *Cause*, (though heretefore not found out, as hath been often said,) of all *Violent Motions*: And when the *Hinder Part* moueth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne ouer: For (turned) it can more easily draw forward the *Lighter Part*. *Galileus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster than the *Water* can

can follow, the *Water* gathereth vpon an heape, towards the *Blinder End*, where the *Mountain* began; Which he suppoſeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cauſe* of the *Ebbing* and *Flowing* of the *Ocean*; becauſe the *Earth* ouer-runneſh the *Water*. Which *Theory*, though it be falſe, yet the firſt *Experiment* is true. As for the *Inequality* of the *Preſſure* of *Parts*, it appeareth manifeſtly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the ſame *Magnitude*, and *Shape*, and throw them with equall *Force*, you cannot poſſibly throw the *Wood*, ſo farre, as the *Stone*, or *Iron*.

It is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you daſh a *Stone* againſt a *Stone* in the *Bottom* of the *Water*, it maketh a *Sound*. So a long *Pole* ſtrucke vpon *Gravel*, in the *Bottom* of the *Water*, maketh a *Sound*. Nay, if you ſhould thinke that the *Sound* cometh vpon by the *Pole*, and not by the *Water*, you ſhall finde that an *Anchor*, let downe by a *Rope*, maketh a *Sound*; And yet the *Rope* is no *Solide Body*, whereby the *Sound* can aſcend.

All *Objects* of the *Senſes*, which are very *Offenſiue*, doe cauſe the *Spirits* to retire; And vpon their *Flight*, the *Parts* are (in ſome degree) deſtitute; And ſo there is induc'd in them a *Trepidation* and *Horror*. For *Sounds*, we ſee that the *Grating* of a *Saw*, or any very *Harſh Noiſe*, will ſet the *Teeth* on edge, and make all the *Body* ſhauer. For *Taſtes*, we ſee that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* ſhake. For *Odious Smells*, the like Effect followeth, which is leſſe perceined, becauſe there is a *Remedy* at hand, by *Stopping* of the *Noſe*: But in *Horſes*, that can vſe no ſuch *Help*, we ſee the *Smell* of a *Carrion*, eſpecially of a *Dead Horſe*, maketh them fly away, and take on, almoſt as if they were *Mad*. For *Feeling*, if you come out of the *Sunne*, ſuddenly, into a *Shade*, there followeth a *Chilneſſe* or *Shiuering* in all the *Body*. And euen in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darkneſſe*, induceth an *Offer* to *Shauer*.

There is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath *Win-downes* onely from aboue: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Hauing a *Doore* in the Middleſt. It reporteth the *Voice*, twelue or thirteene times, if you ſtand by the *Cloſe End-Wall*, ouer againſt the *Doore*. The *Eccho* ſadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* ſoundeth, as if it came from aboue the *Doore*. And if you ſtand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you ſtand in the *Doore*, or in the *Middleſt* juſt ouer againſt the *Doore*, not. Note that all *Eccho's* ſound better againſt *Old walls*, than *New*; becauſe they are more *Dry*, and *Hollow*.

Experiment
Solitary, touching
Water, that it may be
the *Medium* of
Sounds.

792

Experiment
Solitary, of the
Flight of the
Spirits vpon *Odious Objects*.

793

Experiment
Solitary, touching the
Super-Reflexion of
Eccho's.

794

Experiment
Solitary touch-
ing the Force
of Imagination,
Imitating that
of the Sense.

795

Those Effects, which are wrought by the Percussion of the Sense, and by Things in Fact, are produced likewise, in some degree, by the Imagination. Therefore if a Man see another eat Soure or Acide Things, which set the Teeth on edge, this Object tainteth the Imagination. So that hee that seeth the Thing done by another, hath his owne Teeth also set on edge. So if a Man see another turne swiftly, and long; Or if he looke vpon Wheelles that turne, Himselfe waxeth Turne-sicke. So if a Man be vpon an High Place, without Railes, or good Hold, except he be vsed to it, he is Ready to Fall: For Imagining a Fall, it putteth his Spirits into the very Action of a Fall. So Many vpon the Seeing of others Bleed, or Strangled, or Tortured, Themselves are ready to faint, as if they Bled, or were in Strife.

Experiment
Solitary, touch-
ing Preferment
of Bodies.

796

Take a Stocke-Gilly-Flower, and tye it gently vpon a Sticke, and put them both into a Scoope Glasse, full of Quick-silver, so that the Flower be couered: Then lay a little Weight vpon the Top of the Glasse, that may keepe the Sticke downe; And looke vpon them after foure or fise daies; And you shall finde the Flower Fresh, and the Stalke Harder, and lesse Flexible, than it was. If you compare it with another Flower, gathered at the same time, it will be the more manifest. This sheweth, that Bodies doe preferue excellently in Quick-silver; And not preferue only, but, by the Coldnesse of the Quick-silver, Indurate; For the Freshnesse of the Flower may be meerely Conseruation; (which is the more to be obserued, because the Quick-silver presseth the Flower;) But the Stiffenesse of the Stalke, cannot be without Induration, from the Cold (as it seemeth,) of the Quick-silver.

Experiment
Solitary, touch-
ing the
Growth, or
Multiplying of
Metalls.

797

It is reported by some of the Ancients, that in Cyprus, there is a Kinde of Iron, that being cut into Little Peeces, and put into the Ground, if it be well Watred, will increase into Greater Peeces. This is certaine, and knowne of Old; That Lead will multiply, and Increase; As hath beene seene in Old Statues of Stone, which haue beene put in Cellars; The Feet of them being bound with Leaden Bands; Where (after a time,) there appeared, that the Lead did swell; Insomuch as it hanged vpon the Stone like Warts.

Experiment
Solitary, touch-
ing the
Drowning of
the more Base
Metall in the
more Precious.

798

I call Drowning of Metalls, when that the Baser Metall, is so incorporate with the more Rich, as it can by no Meanes be separated againe: which is a kinde of Version, though False: As if Silver should be inseparably incorporated with Gold; Or Copper, and Lead, with Silver. The Ancient Electrum had in it a Fifth of Silver to the Gold; And made a Compound Metall, as fit for most vses, as Gold; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the Compound passe for the Rich Metall Simple, is an Adulteration, or Counterfeiting: But if it be done Auowedly, and without Disguizing, it may be a great Saving of the

the Richer Metall. I remember to haue heard of a Man, skillfull in *Metalls*, that a Fifteenth Part of *Siluer*, incorporate with *Gold*, will not be Recovered by any *Water of Separation*; Except you put a Greater *Quantity* of *Siluer*, to draw to it the Lesse; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantity* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsicke Incorporation*. Note that *Siluer* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Siluer*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Siluer*, as will counteruaile the *Over-Weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficulty. The *Melting* sheweth that it is not *Ieiune*, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Conseruation* of them: Whereby they haue the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-molten* doe lesse any *Weight*? For the *Parts* in *Glasse* are euently Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which haue little, or no *Spirit*: So as there is nothing to fly out; As wee see in the *Staffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Vpon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closenesse* of the *Tangible Parts*; And the *Ieiunenesse* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

It is a Profound *Contemplation* in *Nature*, to consider of the *Emptinesse*, (as we may call it,) or *Insatiation* of seuerall *Bodies*; And of their Appetite to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would neuer receiue them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receiue *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*,) *One is a Glue to another*. *Parchments*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselues be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Asbes*; Nor apparently Porous: *Metalls* themselues doe receiue in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch vpon *Gold*, that will not touch vpon *Siluer*; And e conuerso. And *Gold*, which

Experiment
Solitary tou-
ching Fixation
of Bodies.

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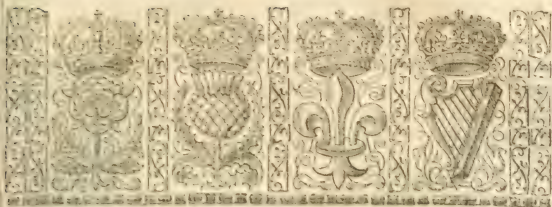
Experiment
Solitary, tou-
ching the Res-
tless Nature of
Things in
Themselves, and
their Desire to
change.

800

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandering Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by *Victor*ry; Or it Selfe to dye, and goe out.

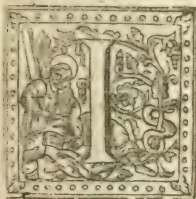
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NATVRALL HISTORIE.

IX. Century.



IT is certaine, that all *Bodies* whatsoeuer, though they haue no *Sense*, yet they haue *Perception* : For when one *Body* is applied to another, there is a *Kinde* of *Election*, to embrace that which is *Agreeable*, and to exclude or expell that which is *Ingrate* : And whether the *Body* be *Alterant*, or *Al-*

tered, euermore a *Perception* precedeth *Operation* : For else all *Bodies* would be alike *One* to *Another*. And sometimes this *Perception*, in some *Kinde* of *Bodies*, is farre more *Subtill* than the *Sense* ; So that the *Sense* is but a dull Thing in Comparison of it : Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as

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Experiments
in Consort,
touching *Per-*
ception in *Bodies*
Insensible, ren-
ding to *Natural*
Diuination, or
Subtill *Trials*.

upon

upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame* fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subiect* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a *Principall Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serueth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the *New Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we haue heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Disimulation* will conceal, or *Discipline* will suppress. Wee shall therefore now handle only, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leauing the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may iudge of the *Effect* to follow: And the like may be said of *Discovery*; But wee tie our Selues here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to *Corrupt* or *Putrifie*, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blastings*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Unwholsome Yeares*.

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The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; haue beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeares*.

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Great, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

Great

Great Droughts in Summer, lasting till towards the End of *August*, and some Gentle Showres vpon them; And then some Drie Weather againe; Doe portend a Pestilent Summer, the Yeare following: For about the End of *August*, all the Sweetnesse of the Earth, which goeth into Plants, and Trees, is exhaled; (And much more if the *August* be dry;) So that nothing then can breathe forth of the Earth, but a grosse Vapour, which is apt to Corrupt the Aire: And that Vapour, by the first Showres, if they be Gentle, is released, and commeth forth abundantly. Therefore they that come abroad soone after those Showres, are commonly taken with Scuruie: And in *Affricke*, no Body will sturre out of doores, after the first Showrer. But if the Showres come vehemently, then they rather walk and fill the Earth, than giue it leaue to breathe forth presently. But if Drie Weather come againe, then it fixeth and continueth the Corruption of the Aire, vpon the first Showres begun; And maketh it of ill Influence, euen to the Next Summer; Except a very Frostie Winter discharge it; Which seldome succeedeth such Droughts.

The Lesser Infections, of the Small Pockes, Purple Feuers, Agues, in the Summer Precedent, and howering all Winter, doe portend a great Pestilence in the Summer following; For Putrefaction doth not rise to his height at once.

It were good to lay a Peece of Raw Flesh, or Fish, in the Open Aire; And if it Putrefie quickly, it is a Signe of a Disposition in the Aire to Putrefaction. And because you cannot be informed, whether the Putrefaction be quicke or slow, except you compare this Experiment with the like Experiment in another Yeare, it were not amisse, in the same Yeare, and at the same Time, to lay one Peece of Flesh, or Fish, in the Open Aire, and another of the same Kinde and Bignesse, within Doores: For I iudge, that if a generall Disposition be in the Aire to Putrefie, the Flesh, or Fish, will sooner Putrefie abroad, where the Aire hath more power, than in the House, where it hath lesse, being many wayes corrected. And this Experiment would be made about the End of March: For that Season is likeliest to discover, what the Winter hath done; And what the Summer following will doe vpon the Aire. And because the Aire (no doubt) receiueth great Transure, and Infusion from the Earth; It were good to trie that Exposing of Flesh, or Fish, both vpon a Stake of Wood, some height above the Earth, and vpon the Flat of the Earth.

Take May-Day, and see whether it putrifie quickly, or no? For that likewise may disclose the Qualitie of the Aire, and Vapour of the Earth, more or lesse Corrupted.

A Drie March, and a Drie May, portend a Wholesome Summer, if there be a Showring Aprill betweene: But otherwise, it is a Signe of a Pestilentiall Yeare;

As the Disconerie of the Disposition of the Aire, is good for the Pragmaticks of Wholesome, and Vnwholesome Yeares; So it is of much more vse, for the Choice of Places to dwell in: At the least, for Lodges, and Residing Places for Health; (For Mansion Houses respect Provisions, as well

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as *Health*; Wherein the *Experiments* aboue mentioned may serue.

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But for the *Choice* of *Places*, or *Seats*, it is good to make *Triall*, not only of *Apinesse* of *Aire* to corrupt, but also of the *Moisture* and *Drinnesse* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diuerfly. Wee see that there be some *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcoats* will also sweat more; so that they will almost run with *Water*: All which, (no doubt,) are caused chiefly by the *Moistnesse* of the *Aire*, in those *Seats*. But because it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

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Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with some other *Places*; And see whether it doth not moisten, and make the *Wooll*, or *Sponge*, &c. more *Ponderous*, than the other? And if it doe, you may iudge of that *Place*, as *Situate* in a *Groſſe*, and *Moist Aire*.

811

Because it is certaine, that in some *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more *Vnequall*, than in Others; And *Inequalitie* of *Aire* is euer an *Enemy* to *Health*; It were good to take two *Weather-Glaſſes*, *Matches* in all things, and to set them, for the same *Houres* of *One day*, in severall *Places*, where no *Shade* is, nor *Encloſures*: And to marke, when you set them, how farre the *Water* commeth; And to compare them, when you come againe, how the *Water* standeth then: And if you finde them *Vnequall*, you may be sure that the *Place* where the *Water* is lowest, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812

The *Predictions* likewise of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Diſcouerie* of the *Cauſes*, as for diuers *Prouiſions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene spoken of before. If *Wainſcoat*, or *Stone*, that haue vsed to sweat, be more drie, in the *Beginning* of *Winter*; Or the *Drops* of the *Eaues* of *Houſes* come more slowly downe, than they vse; it portendeth a *Hard* and *Froſtie Winter*. The *Cauſe* is, for that it sheweth an *Inclination* of the *Aire*, to *Drie Weather*; which in *Winter* is euer ioynd with *Froſt*.

813

Generally, a *Moist* and *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer*, by the *Sunne*; And so they rebound vpon the *Winter*.

814

A *Hot* and *Drie Summer*, and *Autumne*, and especially if the *Heat* and *Drought* extend farre into *September*, portendeth an *Open Beginning* of *Winter*; And *Colds* to ſucceed, toward the latter *Part* of the *Winter*, and the *Beginning* of the *Spring*: For till then, the former *Heat* and *Drought* beare the *Sway*; And the *Vapours* are not ſufficiently *Multiplied*.

815

An *Open* and *Warne Winter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* diſperſe into the *Winter Showres*; Whereas *Cold* and *Froſt* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that vse to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came : As the *Winter-Birds*, (namely *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with vs shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like vnto that *Season* in which they come : As *Swallowes*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow.

The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* vpon the *Shoare* ; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind* ; shew *Wind* to follow : For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceiued, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Cauces* likewise portendeth as much.

The *Upper Regions* of the *Aire*, perceiue the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below : And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*.

Great Mountaines haue a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaine's* below : And therefore they say in *Wales*, when certaine *Hills* haue their *Night-Caps* on, they meane *Mischiefe*. The *Cause* is, for that *Tempests*, which are for the most part bred aboue, in the *Middle Region*, (as they call it,) are soonest perceiued to collect in the *Places* next it.

The *Aire*, and *Fire*, haue *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. Wee see the *Trembling* of a *Candle* will discover a *Wind* that otherwise wee doe not feele ; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be vnquiet ; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they vse. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driuen the *Aire*, is Apparent to the *Sense* : But *Flame* is easier to moue, than *Aire* : And for the *Ashes*, it is no maruell, though *Wind* vnperceiued shake them off ; For wee vsually trie, which way the *Wind* bloweth, by casting vp *Grasse*, or *Chaffe*, or such light Things, into the *Aire*.

When *Wind* expireth from vnder the *Sea* ; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceiued by the *Sense*, vntill there be an *Eruption* of a great *Quantitie*, from vnder the *Water* ; And so it getteth into a *Body* : Whereas in the first *Putting up* it commeth in little *Portions*.

We spake of the *Ashes*, that *Coales* cast off ; And of *Grasse*, and *Chaffe* carried by the *Wind* ; So any *Light Thing* that moueth, when we finde no *Wind*,

Wind, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that Live in the *Open Aire*, (*Sub Diô*,) must needs haue a *Quicker Impression* from the *Aire*, than *Men* that liue most within *Doores*; And especially *Birds*, who liue in the *Aire*, freest, and clearest; And are aptest by their *Voice*, to tell *Tales*, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

823

Water-Fowles, (as *Sea-Gulls*, *More-Hens*, &c.) when they focke and fly together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Density* of the *Aire*: And so desire to be in *Motion*, and vpon the *Wing*, whither soeuer they would otherwise goe: For it is no Maruell, that *Water-Fowle* doe ioy most in that *Aire*, which is likest *Water*; And *Land-Birds* also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call vpon *Raine*: All which is but the Comfort they seeme to receiue in the *Relenting* of the *Aire*.

824

The *Heron*, when she soareth high, (so as sometimes she is seene to passe ouer a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Dry Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heauy of *Wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird of Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the *Streame*. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a *Deepe Water*. And therefore when they are aloft, they can vphold themselves with their *Wings Spread*, scarce mouing them.

825

Fishes, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Dry*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme Lower*.

826

Beasts doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get vp betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put vp his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

The *Trifolium*, against *Raine*, swelleth in the *Stalks*; and so standeth more vpright; But by *Wet*, *Stalks* doe erect, and *Leaves* bow downe. There is a Small *Red Flower* in the *Stubble-Fields*, which Country People call the *Wincipe*; Which if it open in the *Morning*, you may be sure of a faire *Day* to follow.

827

Even in *Mea*, *Acher*, and *Harts*, and *Cornes*, doe encriue, either towards *Raine*, or towards *Frost*: For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we see both *Extremes* bring the *Gout*.

828

Wormes, *Wormes*, &c. doe fore-thew (likewise) *Raine*: For *Earth-wormes* will come forth, and *Moles* will cast vp more, and *Fleas* bite more, against *Raine*.

829

Solide Bodies likewise fore-thew *Raine*. As *Stones*, and *Waincoat*, when they *Sweat*: And *Baxes*, and *Peggs* of *Wood*, when they *Draw*, and *Wind* hard; Though the Former be but from an *Outward Cause*; For that the *Stone*, or *Waincoat*, turneth and beareth backe the *Aire* against it selfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it selfe.

830

Appetite is moued chiefly by Things that are *Cold*, and *Dry*: The *Cause* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth vpon Supply; And so is *Drincke*: And therefore all *Soure Things*, (as *Vinegar*, *Juice* of *Lemons*, *Oyle* of *Nitriall*, &c.) prouoke *Appetite*. And the *Disease*, which they call *Appetitus Caninus*, consisteth in the *Matter* of an *Acid* and *Glossy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is also moued by *Soure Things*; For that *Soure Things* induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great *Cause* of *Appetite*. As for the *Cause*, why *Onions*, and *Salt*, and *Pepper*, in *Baked Meats*, moue *Appetite*, it is by *Felliciation* of those *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Oliues*, *Capers*, and others of that kinde, which participate of *Bitternesse*, they moue *Appetite* by *Absterision*. So as there be foure Principall *Causes* of *Appetite*; The *Refrigeration* of the *Stomach*, ioyned with some *Drincke*; *Contraction*; *Felliciation*; And *Absterision*: Besides *Hunger*, which is an *Emptinesse*: And yet *Over Fastings* doth (many times) cause the *Appetite* to cease; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And such *Humours* as are *Light*, and *Cholericke*, which quench *Appetite* most.

Experiment
Solitary, touching the Nature of Appetite in the Stomach.

831

It hath beene obserued by the *Ancients*, that where a *Raine-Bow* seemeth to hang ouer, or to touch, there breatheth forth a *Sweet Smell*. The *Cause* is, for that this happeneth but in certaine Matters, which haue in themselves some *Sweetnesse*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they also make the *Ground Sweet*: But none are so delicate as the *Dew* of the *Rain-bow*, where it falleth. It may be also, that the *Water* it selfe hath some *Sweetnesse*: For the *Raine-Bow* consisteth of a *Glomeration* of *Small Drops*, which cannot possibly fall, but from the *Aire*, that is very *Low*: And there-

Experiment
Solitary, touching Sweetnesse of Odour, from the Rain-bow.

832

therefore may hold the very *Sweetnesse* of the *Herbs*, and *Flowers*, as a *Distilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preserve the *Smell*, being dissipated in the drawing vp: Neither doe we know, whether some *Water* it selfe, may not haue some degree of *Sweetnesse*. It is true, that wee finde it sensibly in no *Poole*, *Riuer*, nor *Fountain*; But good *Earth*, newly turned vp, hath a *Freshnesse*, and good *Scent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* neuer moue the *Sense*.) may also haue. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will sometimes smell like *Violets*.

Experiment
Solitary, touch-
ing Sweet
Smells.

833

To *Sweet Smells* *Heat* is requisite, to Concoct the *Matter*; And some *Moisture* to Spread the *Breath* of them. For *Heat*, we see that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moisture*, we see that Things too much *Dried*, lose their *Sweetnesse*: And *Flowers* growing, smell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are destroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pinckes*; And generally all *Flowers* that haue *Cool* and *Delicate Spirits*. Some continue both on the *Fire*, and from the *Fire*, As *Rose-Water*, &c. Some doe scarce come forth, or at least not so pleasantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Enclosed in a *Fast Body*: But (generally) those *Smells* are the most *Gratefull*, where the *Degree* of *Heat* is *Small*; Or where the *Strength* of the *Smell* is allayed; For these *Things* doe rather woe the *Sense*, than Satiare it. And therefore the *Smell* of *Violets*, and *Roses*, exceedeth in *Sweetnesse* that of *Spices*, and *Gummes*; And the Strongest Sort of *Smells*, are best in a west, a farre off.

Experiment
Solitary touch-
ing the Cor-
poreall Substance
of Smells.

834

It is certaine, that no *Smell* issueth, but with *Emission* of some *Corporeall Substance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For wee see plainly, that *Smell* doth spread nothing that distance. that the other doe. It is true, that some *Woods* of *Orenges*, and *Heathes* of *Rose-Mary*, will *Smell* a great way into the *Sea*, perhaps twenty Miles; But what is that, since a *Peale* of *Ordinance* will do as much, which moueth in a small compasse? Whereas those *Woods*, and *Heathes*, are of *Vast Spaces*: Besides we see that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloues*, &c. which sheweth them *Corporeall*; And doe Last a great while, which *Sounds*, and *Light* doe not.

Experiment
Solitary touch-
ing Fecule
and Feculent
Odours.

835

The *Excrements* of most *Creatures* *Smell* ill; Chiefly to the same *Creature* that voideth them: For we see, besides that of *Man*, that *Pigeons*, and *Horses* thrive best, if their *Houses*, and *Stables* be kept *Sweet*; And so of *Cage-Birds*: And the *Cat* burieth that which shee voideth: And it holdeth chiefly in those *Beasts*, which feed vpon *Flesh*. *Dogs* (almost) onely of *Beasts*, delight in *Fecide Odours*; Which sheweth there is somewhat in their *Sense* of *Smell*, differing from the *Smells* of other *Beasts*. But the *Cause*, why *Excrements* smell ill, is manifest; For that the

Body

Body it selfe rejecteth them; Much more the *Spirits*: And we see, that those *Excrements*, that are of the *First Digestion*, Smell the worst; As the *Excrement* from the *Belly*: Those that are from the *Second Digestion*, lesse ill; As *Urine*: And those that are from the *Third*, yet lesse; For *Sweat* is not so bad, as the other two; Especially of some *Persons*, that are full of *Heat*. Likewise most *Putrefactions* are of an *Odious Smell*: For they smell either *Fetide*, or *Mondy*. The *Cause* may be, for that *Putrefaction* doth bring forth such a *Consistence*, as is most Contrary to the *Consistence* of the *Body*, whilst it is Sound: For it is a meere dissolution of that *Forme*. Besides, there is another Reason which is Profound: And it is, that the *Objects* that please any of the *Senses*, haue (all) some *Equality*, and (as it were) *order*, in their *Composition*: But where those are wanting, the *Object* is euer Ingrate. So *Mixture* of many *Disagreeing Colours* is euer vnpleasant to the *Eye*: *Mixture* of *Discordant Sounds* is vnpleasant to the *Eare*: *Mixture*, or *Hotch-Patch* of many *Tastes*, is vnpleasant to the *Taste*: *Harshnesse* and *Ruggednesse* of *Bodies*, is vnpleasant to the *Touch*: Now it is certaine, that all *Putrefaction*, being a *Dissolution* of the first *Forme*, is a meere *Confusion*, and *Vnformed Mixture* of the *Part*. Neuerthelesse, it is strange, and seemeth to Crosse the former *Observation*, that some *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Ciuet*, and *Muske*; And as some thinke *Amber-Greece*: For diuers take it, (though vnprobably,) to come from the *Sperme* of *Fish*: And the *Mosse*, wee spake of from *Apple-Trees*, is little better than an *Excretion*. The Reason may be, for that there passeth in the *Excrements*, and remaineth in the *Putrefactions*, some good *Spirits*; especially where they proceed from *Creatures*, that are very *Hot*. But it may be also ioyned with a further *Cause*, which is more Subtill; And it is, that the *Senses* loue not to be Overpleased; But to haue a *Commixture* of somewhat that is in it selfe Ingrate. Certainly, we see how *Discords* in *Musike*, falling vpon *Concords*, make the *Sweetest Straines*: And we see againe, what *Strange Tastes* delight the *Taste*; As *Red-Herrings*, *Caucary*, *Parmizan*, &c. And it may be, the same holdeth in *Smells*. For those kinde of *Smells*, that we haue mentioned, are all Strong, and doe Pull and Vellicate the *Sense*. And wee finde also, that *Places* where Men *Urine*, commonly haue some *Smell* of *Violets*: And *Urine*, if one hath eaten *Nutmegge*, hath so too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Coniugations*; Of the *Influences* of *Heauen*; Of *Heat*, *Cold*, *Moisture*, *Drought*; *Qualities* *Actiue*, *Passiue*; And the like; haue swallowed vp the true *Passages*, and *Processes*, and *Affects*, and *Consistences* of *Matter*, and *Naturall Bodies*. Therefore they are to be set aside, being

but *Notionall*, and *ill Limited*; And *Definite Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these *Kindes of Processes of Natures*, and *Characters of Matter*, we will now set downe some *Instances*.

Experiment
Solitary, touch-
ing the Causes
of Putrefaction.

836

All *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatloeuer else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Body*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Receiued Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but *Nugation*: For *Cold* in *Things Inanimate*, is the greatest Enemy that is, to *Putrefaction*; though it extinguisht *Vinification*, which euer consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Aduentine Heat*, be greatly Predominant, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or *Notable Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Natiue Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages of Nature*; And not by a *Conflict* of *Heats*.

Experiment
Solitary, touch-
ing Bodies
Imperfectly
Mixed.

837

In *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* between the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfecte Mixtum*, and is *Transitory*, and not durable; As *Mists*, *Smokes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vinification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a *Kind* of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment
Solitary touch-
ing Concoction
and Crudity.

838

The word *Concoction*, or *Digestion*, is chiefly taken into vse from *Living Creatures*, and their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Urine* and *Excrements Concocted*; And the *Four Digestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Seuerall Parts* of the *Body*;) are likewise called *Concoctions*: And they are all made to be the *Workes of Heat*: All which *Notions* are but ignorant *Catches* of a few *Things*, which are most *Obuius* to *Mens Observations*. The *Constantest Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Plimiry* of that *Action*, or *Processe*: And while the *Body* to be *Conuerted* and *Altered*, is too strong for the *Efficient*, that should *Conuert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first

Forme,

Forme, or Consistence,) it is (all that while,) *Crude, and Inconcoct*; And the *Process* is to be called *Crudity and Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke of Heat*; But not the *Worke of Heat* alone: For all Things, that further the *Conversion, or Alteration*, (as *Rest, Mixture of a Body already Concocted, &c.*) are also *Meanes to Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation, or Absolute Conversion* and *Subactum*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies of Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies of Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquors, and Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans vse*; As in *Clarifying of Drinkes*; *Ripening of Fruits, &c.* But note, that there be two Kindes of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which wee call *Assimilation*. The other is, when the *Conversion* is into a *Body* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinctions sake, *Transmutation*.

There are also diuers other *Great Alterations* of *Matter, and Bodies*, besides those that tend to *Concoction, and Maturation*; For whatsoeuer doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Maior*: As when *Meat* is *Boyled, or Roasted, or Fried, &c.* Or when *Bread* and *Meat* are *Baked*; Or when *Cheese* is made of *Curds, or Butter of Creame, or Coales of wood, or Bricks of Earth*; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme, or Nomenclature* for it; (as the *Ancients* vsed;) They be but *Shifts of Ignorance*; For *Knowledge* will be cuer a *Wandering and Indgested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of *Instances*, and those well collated,

Experiment
Solitary, touching
Alterations, which may
be called
Maiores.

839

The *Consistences* of *Bodies* are very diuers: *Dense, Rare; Tangible, Pneumaticall, Volatile, Fixed; Determinate, Not Determinate; Hard, Soft; Cleaving, Nor Cleaving; Congealeable, Not Congealeable, Liquefiable, Not Liquefiable, Fragile, Tough; Flexible, Inflexible; Tractile, or to be drawn forth in length, Intractile; Porous, Solide; Equall, and Smooth, Vnequall; Venous, and Fi-*

brous, and with Graines, Entire; And diuers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, and *Drought*, is a Compendious and Inutile Speculation. But of these see principally our *Abecedarium Nature*; And otherwise *Sperism* in this in our *Sylua Sylvarum*: Neuerthelesse in some good part, We shall handle diuers of them now presently.

Experiment
Solitary tou-
ching Bodies Li-
quefiable, and
not Liquefiable.

840

Liquefiable, and *Not Liquefiable*, proceed from these Causes: *Liquefaction* is euer caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Tungide* of *Spirit*; Or that haue their *Spirits* more *Sraightly Imprisoned*; Or againe that hold them *Better Pleased* and *Content*; are *Liquefiable*: For these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the Last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract; And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, euen many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Softten*; As *Iron* in the *Forge*; And a *Sticke* bathed in *Hot Ashes*, which thereby becommeth more *Flexible*. Moreover, there are some *Bodies*, which doe *Liquefie*, or dissolue by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which dissolue in *Water*; As *Salt*, *Sugar*, &c. The Cause of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*; The Cause of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receiue the *Liquour*. Again, there are some *Bodies*, that dissolue with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side haue good store of *Spirit*; And on the other Side, haue the *Tangible Parts* *Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the *Parts* to Receiue the *Liquour*.

Experiment
Solitary tou-
ching Bodies
Fragile, and
Tough.

841

Of *Bodies*, some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is; Some shatter and fly in many Peeeces. Of *Fragility* the Cause is an *Impotency* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Ficitle Earth* is more *Fragile* than *Crude Earth*; And *Dry Wood* than *Greene*. And the Cause of this *Vnaptnesse* to *Extension*, is the Small *Quantity* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is euer *Concomitant* with *Porosity*, and with *Driness* in the *Tangible Parts*: Contrariwise, *Tough Bodies* haue more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore wee see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

All

All *Solide Bodies* consist of *Parts* of two severall *Natures* ; *Pneumaticall*, and *Tangible* ; And it is well to be noted, that the *Pneumaticall Substance* is in some *Beases*, the *Native Spirit* of the *Body* ; And in some other, plain *Aire* that is gotten in ; As in *Bodies* desiccate, by *Heat*, or *Age* : For in them, when the *Native Spirit* goeth forth, and the *Moisture* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are euer the more *Fragile* ; For the *Native Spirit* is more *Yeelding*, and *Extensile*. (especially to follow the *Parts*;) than *Aire*. The *Native Spirits* also admit great *Diuerfities* ; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Virtues*, and *Qualities* (as wee call them) of *Bodies* : But the *Aire Intermixt*, is without *Virtues*, and maketh Things *Insignificant*, and without any *Extimulation*.

Experiment
Solitary, touching the Two
Kinds of *Pneumatics* in *Bodies*.

842

The *Concretion* of *Bodies* is (commonly) solued by the *Contrary* ; As *Ice*, which is congealed by *Cold*, is dissolued by *Heat* ; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolued by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returns* to their former *Nature*, than *Alterations* : So that the *Contrary* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by *Contrary Efficients*, seemeth to be the Same ; And that is, because the *Spirit* of the *Oyle*, by eicher *Meanes*, exhalet little ; For the *Cold* keepeth it in ; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them : As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in stead of Contracting ; And sometimes Rist.

Experiment
Solitary, touching *Concretions*, and Dissolution of *Bodies*.

843

Of *Bodies*, some (wee see) are *Hard*, and some *Soft* : The *Hardnesse* is caused (chiefly) by the *Leiuuennesse* of the *Spirits* ; And their *Impartitie* with the *Tangible Parts* : Both which, if they be in a greater degree, maketh them, not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure* ; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantitie* of *Spirits* ; (which euer helpeth to Induce *Yeelding* and *Cession* ;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following* ; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as wee vse the word,) are of two *Kinds* ; The one, that easily giueth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places* : And therefore wee see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giueth Place : For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth vp at all ; But only the *depressed Part* giueth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession* ; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they giue place (indeed) easily, but then they rise all ouer : Which is a *False Cession* ; For it is in *Place*, and not in *Body*.

Experiment
Solitary, touching *Hard* and *Soft Bodies*.

844

Experiment
Solitary tou-
ching Bodies
Ductile, and
Textile.

845

All Bodies *Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*;) haue in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the *Force*, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese* *roasted*, will draw forth, and *roape*. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is *Plaine*; For all *Wooll*, and *Towe*, and *Cotton*, and *Silke*, (especially raw *Silke*;) haue, besides their *Desire* of *Continuance*, in regard of the *Tennitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to ioyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the *Practise* of *Twirling* about of *Spindles*. And wee see also, that *Gold* and *Siluer Thred* cannot be made without *Twisting*.

Experiment
Solitary, tou-
ching other
Passions of
Matter, and
Characterrs of
Bodies.

846

The Differences of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissile* and *Not Scissile*; And many other *Passions* of *Matter*, are *Plebeian Notions*, applied vnto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Celssion*, or *Not Celssion* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the *Outward Bulke*, and not flying vp. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to *lie Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantitie*, or *Great Quantitie*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Natiue Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Natiue Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The Seueneth is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eighth is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Raritie* of the *Tangible Parts*. The Eleuenth is the *Equalitie* or *Inequalitie* of the *Tangible Parts*. The Twelfth is the *Digestion*, or *Cruditie* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watric* or *Oylie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principiall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length*, or *Transuerse*; (As it is in the *Warpe*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porositie*, or *Imporositie* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smallnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; but these doe occurre for the Present.

Take

Take *Lead*, and melt it, and in the Middest of it, when it beginneth to Congale, make a little Dint, or Hole, and put *Quicke-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quicke-Silver* will fix, and run no more, and endure the Hammer. This is a Noble Instance of *Induration*, by Consent of one Body with another, and Motion of Excitation to Imitate; For to ascribe it only to the Vapour of *Lead*, is lesse Probable. Quere whether the Fixing may be in such a degree, as it will be Figured like other Metals? For if so, you may make Works of it for some purposes, so they come not neere the Fire.

Experiment
Solitary, touching
Induration by sympathy.

847

Sugar hath put downe the vse of *Honey*; Inſomuch as wee haue loſt thoſe Obſervations, and Preparations of *Honey*, which the *Ancients* had, when it was more in Price. Firſt, it ſeemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the Teare or Bloud iſſuing from the Tree: Inſomuch as one of the *Ancients* relateth, that in *Trebiſand*, there was *Honey* iſſuing from the *Bax-Trees*, which made Men Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not ſo Luthious as Ours. They had alſo a Wine of *Honey*, which they made thus. They cruſhed the *Honey* into a great Quantitie of *Water*, and then ſtrained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Veſſels*, for a ſmall time; And after runned it into *Veſſels* of *Wood*, and kept it for many yeares. They haue alſo, at this day, in *Ruſſia*, and thoſe *Northerne Countries*, *Mead Simple*, which (well made, and ſeaſoned) is a good wholeſome *Drinke*, and very Cleare. They uſe alſo in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that wee haue loſt in *Honey*, there were brought in uſe a *Sugar-Mead*, (for ſo wee may call it,) though without any Mixture at all of *Honey*; And to brew it, and keepe it ſtale, as they uſe *Mead*; For certainly, though it would not be ſo *Aſterſine*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be uſed in *Sharpe Diſeaſes*: For wee ſee, that the uſe of *Sugar* in *Beere*, and *Ale*, hath good Effects in ſuch Caſes.

Experiment
Solitary touching
Honey and Sugar.

848

It is reported by the *Ancients*, that there was a Kinde of *Steele*, in ſome places, which would poliſh almoſt as white and bright as *Silver*. And that there was in *India* a Kinde of *Brasse*, which (being poliſhed) could ſcarce be diſcerned from *Gold*. This was in the *Natural Fire*; But I am doubtfull, whether Men haue ſufficiently refined Metals, which we account *Base*; As whether *Iron*, *Brasse*, and *Tinne*, be refined to the Height? But when they come to ſuch a Fineneſſe, as ſerueth the ordinary uſe, they trie no further.

Experiment
Solitary, touching the Finer
Sort of Eaſe
Metals.

849

There haue beene found certaine *Cements* vnder *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*:

Experiment
Solitary touching
Cements and Quarries.

There

850

There are also ordinary *Quarries* in *Somerset-Shire*, which in the *Quarry* cut soft to any Bigneſſe, and in the *Building* proue firme, and hard.

Experiment
Solitary, touch-
ing the Al-
teration of the Col-
our of Haires
and Feathers.

851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White*: As is ſeene in *Mew*, though ſome Earlier, ſome Later; In *Horſes*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grifly*; And many Others. So doe ſome *Birds*; As *Cygnets*, from *Gray* turne *White*; *Hawkes*, from *Browne* turne more *White*: And ſome *Birds* there be, that vpon their *Moulting*, doe turne *Colour*; As *Robin-Redbreſts*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* vpon the *Head*. The *Cauſe* is, for that *Moifſture* doth (chiefly) colour *Haire*, and *Feathers*; And *Driueſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and ſo all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the moſt part,) wax *Harer* later. Out of this Ground, a *Man* may deuife the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Haare-Haires*. But of this ſee the fifth *Experiment*.

Experiment
Solitary, touch-
ing the Dif-
ferences of Li-
uing Creatures,
Male & Female.

852

The *Difference* betweene *Male* and *Female*, in ſome *Creatures*, is not to be diſcerned, otherwiſe than in the *Parts* of *Generation*: As in *Horſes* and *Mares*, *Dogs* and *Bitches*, *Dones* *He* and *She*, and others. But ſome differ in *Magnitude*, and that diuerſly; For in moſt the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*, and the like: And in ſome few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantitie*, *Criſpation*, and *Colours* of them; As *He-Lions* are *Hirſute*, and haue great *Maines*; The *She's* are ſmooth like *Cats*. *Bulls* are more *Criſſe* vpon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*, and *Gold-Finch-Cocke*, haue glorious and fine *Colours*; The *Henn's* haue not. Generally, the *Hees* in *Birds* haue the faireſt *Feathers*. Some differ in diuers *Features*; As *Bucks* haue *Hornes*, *Doe's* none; *Rammes* haue more wreathed *Hornes* than *Ewes*; *Cocks* haue great *Combes* and *Spurres*, *Henns* little or none; *Boares* haue great *Fangs*, *Sowes* much leſſe; The *Turkey-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* haue generally *Deeper* and *Stronger Voices* than *Women*. Some differ in *Facultie*; As the *Cocks* amongſt *Singing Birds*, are the beſt *Singers*. The Chiefe *Cauſe* of all theſe, (no doubt,) is, for that the *Males* haue more *Strength* of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures* *Males*, are like *Females*; And ſo are *Eunuchs*, and *Gelt Creatures* of all kinds, like *Females*. Now *Heat* cauſeth *Greatneſſe* of *Growth*, generally, where there is *Moifſture* enough to worke vpon: But if there be found in any *Creature*, (which is ſeene rarely,) an *Ouer-great Heat* in proportion to the *Moifſture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moifſture*, then there is no *Difference* to be ſeene betweene *Male* and *Female*:

males: As in the *Instances* of *Horses*, and *Dogs*. Wee see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Again, *Heat* causeth *Pileosity*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which *Want* of *Heat* cannot Expell: And that is the *Cause* of the *Beauty* and *Variety* of *Featuers*: Again, *Heat* doth put forth many *Excrescences*, and much *Solide Matter*, which *Want* of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combes* and *Spurres* of *Cocks*, *Gills* of *Turky-Cocks*, and *Fangs* of *Boures*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepe*nesse of the *Voice*. Again, *Heat* refineth the *Spirits*, and that causeth the *Cock-Singing Bird*, to Excell the *Hen*.

There be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the *Cause* may be, that because they Live not in the *Aire*, they have not their *Moisture* drawne and Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwaies, in a manner, and are supported by the *Water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Wombe*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Eggs* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female*: For the *Sitting* doth *Finishe*, and not Nourish.

We haue partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this we adde further, that the *Cause* must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry Sap*: And we see that it is possible, to make a *Tree* put forth onely in *Mosses*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more into *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted vpon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the Iuyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene obserued, that in *Pollards*, if the *Water* get in on the *Top*, and they become *Hollow*, they put forth the more. We adde also, that it is deliuered for certaine by some, that if the *cions* be grafted, the *Small End* downwards, it will make *Fruit* haue little or no *Coares*, and *Stones*.

Tobacco is a thing of great *Price*, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards *Charge*. The *Charge* of making the *Ground*, and otherwise, is great, but nothing to the *Profit*. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy*: Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same *Cause*: So that

Experiment
Solitary, touching the
Comparative Magnitude of Living
Creatures.

853

Experiment
Solitary, touching Exoffation
of Fruits.

854

Experiment
Solitary, touching the
Melioration of Tobacco.

855

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, were a Thing of great profit. Some haue gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco*: But those are but *Sophistications*, and *Toyes*; For Nothing that is once *Perfect*, and hath run his *Race*, can receiue much *Amendment*. You must euer resort to the *Beginnings* of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne*: We see some Leading of this in *Musk-Melons*; which are sown vpon a *Hot Bed*, Dunged below, vpon a *Bancke* turned vpon the *South Sunne*, to giue *Heat* by *Reflexion*; Laid vpon *Tiles*, which increaseth the *Heat*; And Couered with *Straw* to keepe them from *Cold*. They remoue them also, which addeth some *Life*: And by these *Helpes* they become as good in *England*, as in *Italy*, or *Prouence*. These, and the like *Meanes*, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may giue them *Vigour* to put forth *Strong*.

Experiment
Solitary touch-
ing a generall
Heat, within
the same Eff-
fects.

856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vinification* of *Living Creatures*; are both represented and supplied, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set vpon the *Backes* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that haue beene drawne in at the *Window* of a *Kitchen*, haue sent forth *Grapes* ripe a *Month* (at least) before others. *Stones*, at the *Backe* of *Walls*, bring forth *Orenges* here with vs, *Egges*, as is reported by some, haue beene hatched in the warmth of an *Ouen*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egs* vnder *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment
Solitary touch-
ing Swelling
and Dilatation
in Boiling.

857

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a *Quarter* of a *Pint* (vnboyled) will arise to a *Pint* boyled. The *Cause* (no doubt) is, for that the more *Close* and *Compact* the *Body* is, the more it will dilate: Now *Barley* is the most *Hollow*; *Wheat* more *Solide* than that; and *Rize* most *Solide* of all. It may be also that some *Bodies* haue a *Kind* of *Leisure*, and more *Depertible Nature* than others; As we see it Euident in *Colouration*; For a *Small Quantity* of *Saffron*, will *Tinct* more, than a very great *Quantity* of *Bresill*, or *Wine*.

Experiment
Solitary touch-
ing the Dilatation
of
Fruit.

858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damascins*, &c. By *Rottenesse*; As *Medlars*, *Serueses*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine *Speciall Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emolition*, which they properly enduce; As in *Beating* of *Steck-Fish*, *Flesh*, &c. By *Rottenesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby digest the

the Harder Part: For in all *Paſſions*, there is a *Degree of Heat*. By *Time* and *Keeping* is, becauſe the *Spirits* of the *Body*, doe euer feed vpon the *Tangible Parts*, and attenuate them. By *Seuerall Maturations* is, by ſome *Degree of Heat*. And by *Fire* is, becauſe it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Sourenesse* conſiſteth in ſome *Graſſenesse* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which euer induceth a *Milder Taſte*.

Of *Fleſhes*, ſome are *Edible*; Some, except it be in *Famine*, not. For thoſe that are not *Edible*, the *Cauſe* is, for that they haue (commonly) too much *Bitterneſſe* of *Taſte*; And therefore thoſe *Creatures*, which are *Fierce* and *Cholerick*, are not *Edible*; As *Lions*, *Wolues*, *Squirrells*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We ſee they are *Milde*, and *Faſtfull*. Yet it is true, that *Horſes*, which are *Beaſts* of *Courage*, haue beene, and are eaten by ſome *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineſes* eat *Horſe-fleſh* at this day; And ſome *Gluttons* haue uſed to haue *Colts-fleſh* baked. In *Birds*, ſuch as are *Carniuore*, and *Birds of Prey*, are commonly no *Good Meat*; But the *Reaſon* is, rather the *Cholerick Nature* of thoſe *Birds*, than their *Feeding* vpon *Fleſh*; For *Puits*, *Gulls*, *Shoublers*, *Duckes*, doe feed vpon *Fleſh*, and yet are *Good Meat*: And wee ſee, that thoſe *Birds*, which are of *Prey*, or feed vpon *Fleſh*, are *good Meat*, when they are very *Young*; As *Hawkes*, *Rookes* out of the *Neaſt*, *Owles*, &c. *Mans Fleſh* is not *Eaten*. The *Reaſons* are *Three*: *Fiſt*, becauſe *Men* in *Humani-ty* doe abhorre it: *Secondly*, becauſe no *Living Creature*, that *Dyeth* of *it ſelfe*, is good to *Eat*: And therefore the *Caniballs* (themſelues) eat no *Mans fleſh*, of thoſe that *Dye of Themſelues*, but of ſuch as are *Slaine*. The *Third* is, becauſe there muſt be (generally) ſome *Diſparity*, between the *Nouriſhment*, and the *Body Nouriſhed*; And they muſt not be *Ouer-neere*, or like: Yet we ſee, that in great *Weakenesse*, and *Conſumptions*, *Men* haue beene ſuſtained with *Womans Milke*: And *Ficinus* fondly (as I conceiue) aduſeth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of ſome wholeſome *Young Man*; And the *Bloud* to be ſucked. It is ſaid, that *Witches* doe greedily eat *Mans fleſh*; which if it be true, beſides a *Diuellish Appetite* in them, it is likely to proceed, for that *Mans fleſh* may ſend vp *High* and *Pleaſing Vapours*, which may ſtirre the *Imagination*; And *Witches* *Felicity* is chiefly in *Imagination*, as hath beene ſaid.

There is an *Ancient Receiued Tradition* of the *Salamander*, that it liueth in the *Fire*, and hath force alſo to extinguiſh the *Fire*. It muſt haue two Things, if it be true, to this *Operation*: The One a very *Cloſe Skin*, whereby *Flame*, which in the *Midſt* is not ſo hot, cannot enter: For we ſee that if the *Palme* of the *Hand* be annointed thicke with *White of Egge*, and then *Aquauita* be poured vpon it, and Enflamed, yet one may endure the *Flame* a pretty while. The other is ſome *Extreme Cold* and

Experiment
Solitary, tou-
ching *Fleſh* E-
dible, and not
Edible.

859

Experiment
Solitary, tou-
ching the *Sala-
mander*.

860

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *Wilde-Fire*, better than *Water*, because it entreteth better.

Experiment
Solitary, touch-
ing the Con-
trary Operations
of Time, vpon
Fruits, and Li-
quours.

861

Time doth change *Fruit*, (as *Apples*, *Pearces*, *Pomgranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours*, (even those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Veriuyne*, &c. The Cause is, the *Congregation* of the *Spirits* together: For in both *Kindes*, the *Spirit* is attenuated by *Time*; But in the first *Kinde*, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but digest: But in *Drinkes* the *Spirits* doe raigne, and finding lesse *Opposition* of the *Parts*, become themselves more *Strong*; Which causeth also more *Strength* in the *Liquour*; Such, as if the *Spirits* be of the *Hotter Sort*, the *Liquour* becommeth apt to *Burne*; But in *Time*, it causeth likewise, when the *Higher Spirits* are *Euapourated*, more *Sourenesse*.

Experiment
Solitary touch-
ing *Blowes* and
Bruises.

862

It hath beene obserued by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The Cause is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters*, and *Ointments* doe enter. Surely, the Cause, that *Blowes* and *Bruises* enduce *Swellings*, is, for that the *Spirits* resorting to *Succour* the *Part* that *Laboureth*, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment
Solitary, touch-
ing the *Orris*
Root.

863

The *Nature* of the *Orris Root*, is almost *Singular*; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetnesse* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to haue a *Tender dainty Heat*; Which when it commeth aboute *Ground*, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a *Smell* like a *Violet*.

Experiment
Solitary touch-
ing the Com-
pression of Li-
quours.

864

It hath beene obserued by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*; And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The Cause may be *Triuiall*; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the *Sides* of the *Bottles*: But there may be a Cause more *Subtill*; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a *Small Quantity* of *Liquour*, mee-
teth

teeth with the Sides of the Bottles, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it be *Papour*. The Cause is, for that Heat, and Cold haue a *Virtual Transfusion*, without *Communication* of Substance; but *Moisture* not: And to all *Melissifaction* there is required an *Imbibition*: But where the *Bodies* are of such generall Leuity, and Grauity, as they Mingle not, there can follow no *Imbibition*. And therefore, Oyle likewise lyeth at the Top of the *Water*, without Commixture: And a Drop of *Water*, running swiftly ouer a *Straw*, or *Smooth Body*, wetteth not.

Starre-like Nights, yea and bright *Moone-shine Nights*, are Colder than *Cloudy Nights*. The Cause is, the *Driness* and *Finenesse* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharpe*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it telle inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true Cause of Cold, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some *Secret Degree* of *Heat*: As it is not likewise without some *Secret Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

The *Eyes* doe moue one and the same way; For when one *Eye* moueth to the *Noshrill*, the other moueth from the *Noshrill*. The Cause is *Motion of Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Nse* will induce the Contrary: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set vpon a *Table*, with a *Candle* behinde them, both *Eyes* will moue Outwards; As affecting to see the *Light*, and so induce *Squinting*.

We see more exquisitely with *One Eye Shut*, than with *Both Open*. The Cause is, for that the *Spirits Visuall* vnite themselues more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth.

The *Eyes*, if the *Sight* meet not in one *Angle*, See *Things Double*. The Cause is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the same Effect: And therefore a little *Pellet*, held betweene two *Fingers*, laid a-crosse, seemeth *Double*.

Pore-blinde Men, see best in the *Dimmer Lights*; And likewise haue their *Sight* Stronger neare hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The Cause is, for that the *Spirits Visuall*, in those that are *Pore blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* disperseth them. For the same Cause

Experiment Solitary, touching the Working of Water vpon Aire contiguous.

865

Experiment Solitary, touching the Nature of Aire.

866

Experiments in Consort, touching the Eyes, and Sight.

867

868

869

870

Cause they need Contracting; But being *Contracted*, are more strong, than the *Visuall Spirits* of Ordinary *Eyes* are; As when we see thorow a *Lenell*, the *Sight* is the Stronger: And so is it, when yon gather the *Eye-lids* somewhat close: And it is commonly scene in those that are *Pore-blind*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would see to Reade, put the Paper somewhat a farre off. The Cause is, for that *Old Mens Spirits Visuall*, contrary to those of *Pore-blind Men*, write not, but when the *Object* is at some good distance, from their *Eyes*.

871

Men see better, when their *Eyes* are over-against the *Sunne*, or a *Candle*, if they put their *Hand* a little before their *Eye*. The Reason is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfused* is enough for the *Perception*. For we see, that an *Over-light* maketh the *Eyes* Dazell; Inſomuch as Perpetuall Looking againſt the *Sunne*, would Cauſe *Blindneſſe*. Again, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwiſe, if they come out of a *Darke Roome*, into a *Light Roome*, they ſeeme to haue a *Miſt* before their *Eyes*, and ſee worſe, than they ſhall doe, after they haue ſtayed a little while, either in the *Light*, or in the *Darke*. The Cause is, for that the *Spirits Visuall*, are vpon a Sudden Change, diſturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* ſuddenly; And when they are much *Contracted* by *Darkneſſe*, they cannot *Dilate* ſuddenly. And Exceſſe of both theſe, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Visuall*,) if it be long, Deſtroyeth the *Eye*. For as long Looking againſt the *Sunne*, or *Fire*, hurteth the *Eye* by *Dilatation*; So *Curious Painiing* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872

It hath beene obſerued, that in *Anger*, the *Eyes* wax *Red*; And in *Bluſhing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The Cause is, for that in *Anger*, the *Spirits* aſcend and wax *Eager*; Which is moſt eaſily ſcene in the *Eyes*, becauſe they are *Translucide*; Though withall it maketh both the *Cheekes*, and the *Gills* *Red*; But in *Bluſhing*, it is true, the *Spirits* aſcend likewise to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulſed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits*, that aſcend to them, as vnwilling to looke abroad: For no *Man*, in that *Paſſion*, doth looke ſtrongly, but Deieſtredly; And that *Repulſion* from the *Eyes*, Diuerteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873

The *Objects* of the *Sight*, may cauſe a great *Pleasure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*; Except it be by *Memory*, as hath beene ſaid. The *Glimpses* and *Beaues* of *Diamonds* that ſtrike the *Eye*; *Indian Feathers*, that haue glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furniſhed; A *Beauſifull* Perſon; And the like; doe delight and exhilarate the *Spirits* much. The

Reason,

Reason, why it holdest not in the *Offence*, is, for that the *Sight* is the most *Spiritual* of the *Senses*; whereby it hath no *Obiect* Groesse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Obiects* to offend the *Eye*. For *Harmonical Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smells*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Taste*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blackness*, and *Darkness*, are indeed but *Privations*; And therefore have little or no *Affiance*. Somewhat they doe Contristate, but very little.

Water of the Sea, or otherwise, looketh *Black* when it is moved, and *White* when it resteth. The *Cause* is, for that by meenes of the *Motion*, the *Beames* of light passe not *Straight*, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe *Straight*. Beside, *Splendor* hath a *Degree of Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behind, looketh *White*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in Trying by what Meanes *Motion* may hinder *Sight*.

Shells may have bene, by some of the *Antients*, compared and sorted with the *Insects*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Moue. Neuertheless it is certaine, that *Oysters*, and *Cockles*, and *Muscles*, which Moue not, have no discriminate *Sex*: *Quære* in what time, and how they are bred? It seemeth that *Shells* or *Oysters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirty yeares: But then, which is strange, it hath bene tried, that they doe not only *Gaye*, and *Shut*, as the *Oysters* doe, but *Remoue* from one Place to Another.

The *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Brain*, which is the *Instrument of Sense*, is alike on both *Sides*; But *Motion*, and *Habillities of Mouing*, are somewhat holpen from the *Limbs*, which lye on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the Time of our Birth; But the *Limmes* are vsed most on the *Right Side*, whereby *Custom* helpeth; For wee see that some are *Left-Handed*: Which are such, as haue vsed the *Left-Hand* most.

Frictions make the *Parts* more *Fleshie*, and *Full*: As wee see both in *Men*; And in *Carrying of Horses*, &c. The *Cause* is, for that they draw greater *Quantities* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

Experiment
Solitary, touch-
ing the *Colour*
of the *Sea*, or
other *Water*.

874

Experiment
Solitary touch-
ing *Shells*
Fish.

875

Experiment
Solitary, touch-
ing the *Right*
Side, and the
Left.

876

Experiment
Solitary touch-
ing *Frictions*.

877

crementitious Moisture, which lieth in the *Flesh*: All which helpe *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we haue noted heretofore,) *Gaily-Slaues* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment
Solitary touching
Globes
appearing Flat
at Distance.

878

All *Globes* as farre off appeare *Flat*. The *Cause* is, for that *Distance*, being a *Secondary Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Dusky Paper*: And all *Engrauings*, and *Embossings*, (as farre off) appeare *Plaine*.

Experiment
Solitary touching
Shadows

879

The *Utmost Parts* of *Shadows* seeme euer to *Tremble*. The *Cause* is, for that the little *Mouts*, which wee see in the *Sunne*, doe euer *Stirre*, though there be no *Wind*; And therefore those *Mouing*, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to *Moue*, because the *Medium* *Moueth*.

Experiment
Solitary touching the
Rowling and
Ereaching of the
Seas

880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* *Rowleth*, and *Moueth*, both more *Slowly*, and with a *Sloper Rise*, and *Fall*: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the *Bottom*; there it *moueth* more *Swiftly*, and more in *Precipice*; For in the *Breaking* of the *Waues* there is euer a *Precipice*.

Experiment
Solitary touching the
Distillation of
Salt Water.

881

It hath bene obserued by the *Ancients*, that *Salt-Water* *Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottom*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For *Simple Distilled Waters*, of *Wormewood*, and the like, are not *Bitter*.

Experiment
Solitary touching the
Regning of Salt
nesse in Pits vpon
the Sea-Shore.

882

It hath bene set downe before, that *Pits* vpon the *Sea-Shore*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some *Places* of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the very *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tinged with *Salt*.

Salt. The Remedy therefore is, to digge still *New Pus*, when the old wax *Brackish*; As if you would change your *Strainer*.

It hath beene obserued by the *Ancients*, that *Salt Water*, will dissolue *Salt* put into it, in lesse time, than *Fresh Water* will dissolue it. The *Cause* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Substance*, draw the *Salt* new put in, vnto it; Whereby it diffuseth in the *Liquour* more speedily. This is a Noble *Experiment*, if it be true; For it sheweth Meanes of more Quicke and Easie *Infusions*; And it is likewise a good *Instance* of *Attraction*, by *Similitude* of *Substance*. Tye it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Pusugred*.

Experiment
Solitary tou-
ching *Attraction*
by *Similitude*
of *Substance*.

883

Put *Sugar* into *Wine*, part of it above, part vnder the *Wine*; And you shall finde, (that which may seeme strange,) that the *Sugar* about the *Wine*, will soften and dissolue sooner, than that within the *Wine*. The *Cause* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is vnder the *Wine*, by *Simple Infusion*, or *Spreading*; But that *Part* about the *Wine*, is likewise forced by *Sucking*; For all *Spongie Bodies* expell the *Aire*, and draw in *Liquour*, if it be *Contiguous*; As wee see it also in *Sponges*, put part about the *Water*. It is worthy the *Inquiry*, to see how you may make more *Accurate Infusions*, by *Helpe* of *Attraction*.

Experiment
Solitary tou-
ching *Attraction*.

884

Water in Wells is warmer in *Winter*, than in *Summer*: And so *Aire* in *Caves*. The *Cause* is, for that in the *Hither Parts*, vnder the *Earth*, there is a *Degree* of some *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which shut close in, (as in *Winter*,) is the *More*; But if it *Perspire*, (as it doth in *Summer*,) it is the *Lesse*.

Experiment
Solitary tou-
ching *Heat* vn-
der *Earth*.

885

It is reported, that amongst the *Leucadians*, in *Ancient* time, vpon a *Superstition*, they did vse to *Precipitate* a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with *Strings*, at some distance, many great *Fowles*; And fixing vnto his *Body* diuers *Feathers*, spred, to breake the *Fall*. Certainly many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare vp a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and close, and in great *Bredth*, will likewise beare vp a great *Weight*; Being euen laid, without *Tilting* vpon the *Sides*. The further *Extension* of this *Experiment* for *Flying* may be thought vpon.

Experiment
Solitary tou-
ching *Flying* in
the *Aire*.

886

There is, in some *Places*, (namely in *Cephalonia*,) a little *Shrub*, which they call *Holy-Oake*, or *Dwarfe-Oake*: Vpon the *Leaues* whereof there riseth a *Tumour*, like a *Blister*; Which they gather, and rub out of it, a certaine *Red Dust*, that conuerteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to *Quicknen*: With this *Dust* they die *Scarlet*.

Experiment
Solitary tou-
ching the *Dye*
of *Scarlet*.

887

In *Zant*, it is very ordinary, to make *Men Impotent*, to accompany
H h with

Experiment
Solitary tou-

ching Malef-
ciating.

888

Experiment
Solitary, tou-
ching the Rise
of Water, by
Meanes of
Flame.

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Experiments
in Consort,
touching the
Influences of
the Moone.

with their *Wines*. The like is Practised in *Gasconie*; Where it is called *Nouer P'euillette*. It is practised alwayes vpon the *Wedding Day*. And in *Zant*, the Mothers themselues doe it, by way of Preuention; Because thereby they hinder other *Charmes*, and can vndoe their Owne. It is a Thing the *Ciuill Law* taketh knowledge of; And therefore is of no Light Regard.

It is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*.) And set a *Candle* lighted in the *Bottom* of a *Basen* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, ouer the *Candle*, and it will make the *Water* rise. They ascribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is con-
red, being suffocated by the *Cloſe Aire*, lesseneth by little and little: Du-
ring which time, there is some little *Ascent* of *Water*, but not much: For
the *Flame* Occupying lesse and lesse *Roome*, as it lesseneth, the *Water*
succeedeth. But vpon the *Instant* of the *Candles Going out*, there is a sud-
den *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth
no more *Place*; And so the *Aire*, and the *Water* succeed. It worketh the
same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Basen*:
Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Non-*
riſſment; As it is supposed; For all *Bodies* are alike vnto it; As it is euer
in *Motion* of *Nexe*; Inſomuch as I haue ſcene the *Glasse*, being held by
the *Hand*, hath liſted vp the *Basen*, and all: The *Motion* of *Nexe* did ſe
Claspe the *Bottom* of the *Basen*. That *Experiment*, when the *Basen* was
liſted vp, was made with *Oyle*, and not with *Water*: Neuertheſſe this is
true, that at the very first *Setting* of the *Mouth* of the *Glasse*, vpon the *Bot-*
tome of the *Basen*, it draweth vp the *Water* a little, and then ſtandeth at a
Stay, almoſt till the *Candles Going out*, as was ſaid. This may ſhew ſome
Attraction at firſt: But of this we will ſpeake more, when we handle *At-*
tractions by *Heat*.

Of the *Power* of the *Celeſtiall Bodies*, and what more *Se-*
cret Influences they haue, beſides the two *Manifest Influences*
of *Heat*, and *Light*, We ſhall ſpeake, when we handle *Experi-*
ments touching the *Celeſtiall Bodies*: Meane-while, wee will
giue ſome *Directions* for more certaine *Trials*, of the *Vertue*
and *Influences* of the *Moone*; which is our *Neareſt Neigh-*
bour.

The *Influences* of the *Moone*, (moſt obſerued,) are *Four*e.
The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*:
The *Increase* of *Moifture*: The *Exciting* of the *Motions* of
Spirits.

For

For the *Drawing forth of Heat*, we have formerly prescribed, to take *Water Warms*, and to set Part of it against the *Moone-Beames*, and Part of it with a *Screen* between; And to see whether that which standeth Exposed to the *Beames*, will not *Cool* sooner. But because this is but a *Small Interposition*, (though in the *Sunne* wee see a *Small Shade* doth much,) it were good to try it, when the *Moone* shineth, and when the *Moone* shineth not at all; And with *Water Warms* in a *Glasse-Bottle*, as well as in a *Dish*; And with *Cinders*; And with *Iron Red-Hot*; &c.

For the *Inducing of Putrefaction*, it were good to try it with *Flesh*, or *Fish*, Exposed to the *Moone-Beames*; And againe Exposed to the *Aire*, when the *Moone* shineth not, for the like time; To see whether will corrupt sooner: And try it also with *Capon*, or some other *Fowle*, laid abroad, to see whether it will mortifie, and become tender sooner? Try it also with *Dead Flies*, or *Dead Wormes*, having a little *Water* cast vpon them, to see whether will *Putrifie* sooner. Try it also with an *Apple*, or *Orange*, hauing *Holes* made in their *Tops*, to see whether will Rot or Mould sooner? Try it also with *Holland-Cheese*, hauing *Wine* put into it, whether will breed *Mites* sooner, or greater?

For the *Increase of Moisture*, the Opinion Receiued is; That *Seeds* will grow soonest; And *Haire*, and *Nailles*, and *Hedges*, and *Herbs*, Cut, &c. will grow soonest, if they be Set, or Cut, in the *Increase* of the *Moone*. Also that *Braines* in *Rabbits*, *Wood-cocks*, *Calues*, &c. are fullest in the *Full* of the *Moone*: And so of *Marrow* in the *Bones*; And so of *Oysters*, and *Cockles*, which of all the rest are the easiest tried, if you haue them in *Pits*.

Take some *Seeds*, or *Roots*, (as *Onions*, &c.) and set some of them immediately after the *Change*; And others of the same kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* also the Same as neare as may be; And therefore best in *Pots*: Let the *Pots* also stand, where no *Raine*, or *Sunne* may come to them, lest the *Difference* of the *Weather* confound the *Experiment*: And then see in what *Time*, the *Seeds* Set in the *Increase* of the *Moone*, come to a certaine Height; And how they differ from those that are Set in the *Decrease* of the *Moone*.

It is like, that the *Braine* of *Man* waxeth *Moister*, and *Fuller*, vpon the *Full* of the *Moone*: And therefore it were good for those that haue *Moist Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Rose-Mary*, *Frankincense*, &c. about the full of the *Moone*. It is like also, that the *Humours* in *Mens Bodies*, Increase, and Decrease, as the *Moone* doth; And therefore it were good to Purge, some day, or two, after the *Full*; For that then the *Humours* will not replenish so soone againe.

As for the *Exciting* of the *Motion* of the *Spirits*, you must note that the *Growth* of *Hedges*, *Herbes*, *Haire*, &c. is caused from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increase* of the *Moisture*. But for *Spirits* in particular, the great *Instance* is in *Lunacies*.

There may be other *Secret Effects* of the *Influence* of the *Moone*, which are yet brought into *Observation*. It may be, that if it so fall

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out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be obserued.

It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandry*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egs* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quare* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*?

Experiment
Solitary touch-
ing *Vinegar*.

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The *Turning of Wine to Vinegar*, is a Kinde of *Putrefaction*: And in *Making of Vinegar*, they vse to set *Vessels* of *Wine* ouer against the *Noone-Sunne*; which calleth out the more *Oily Spirits*, and leaueth the *Liquour* more *Soure*, and *Hard*. We see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said, that *Cider* in *Mani-ations* vnder the *Line* ripeneth, when *Wine* or *Beere* *Soureth*. It were good to set a *Rundle* of *Periuyce* ouer against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will *Ripen*, and *Sweeten*.

Experiment
Solitary touch-
ing *Creatures*
that sleepe all
Winter.

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There be diuers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want of Assimilating*; For whatsoeuer *Assimilatesh* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, haue been obserued not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remoue*. And they get *Warme* and *Cloze Places* to *Sleepe* in. When the *Flemmings* Wintred in *Noua Zembla*, the *Beares*, about the *Middle* of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Bear* breedeth, and lyeth in with her *Young*, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment
Solitary touch-
ing the Gene-
rating of *Crea-
tures* by *Copula-
tion*, and by *Put-
refaction*.

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Some *Liuing Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (neuerthelesse) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vniification*, is a *Gentle* and *Proportionable Heat*, working vpon a *Glutinous* and *Teelding* substance: For the *Heat* doth bring forth *Spirits* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirits* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Teelding*, is driuen towards by the *Motion* of the *Spirits*, after some *Smelling* into *Shape*, and *Members*.

There-

Therefore all *Sperme*, all *Mensstruous Substance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, haue euermore a *Cloſeneſſe*, *Lentour*, and *Sequacity*. It ſeemeth therefore, that the *Generation* by *Sperme* onely, and by *Putrefaction*, haue two Different *Causes*. The First is, for that *Creatures*, which haue a *Definite* and *Exact Shape*, (as thoſe haue which are Procreated by *Copulation*.) cannot be produced by a *Wake*, and *Cauall Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perſect Creatures*; For if the *Time* required in *Viniſication* be of any length, then the *Spirit* will *Exhale*, before the *Creature* be *Mature*: Except it be *Encloſed* in a *Place* where it may haue *Continuance* of the *Heat*, *Acceſſe* of ſome *Nouriſhment* to maintaine it, and *Cloſeneſſe* that may keepe it from *Exhaling*. And ſuch *Places* are the *Wombes*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Uncertaine Shape*; And are made in *Shorter Time*; And need not ſo *Perſect* an *Encloſure*, though ſome *Cloſeneſſe* be commonly required. As for the *Heathen Opinion*, which was, that vpon great *Mutations* of the *World*, *Perſect Creatures* were firſt Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and ſuch like, are now; Wee know it to be vaine: But if any ſuch Thing ſhould be admitted, *Diſcourſing* according to *Senſe*, it cannot be, except you admit a *Chaos* firſt, & *Commixture* of *Heaven*, and *Earth*. For the *Frame* of the *World*, once in *Order*, cannot effect it by any *Exceſſe*, or *Cauallie*.

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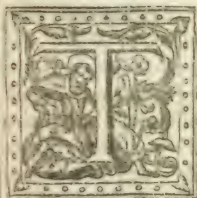
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NATVRALL HISTORIE.

X. Century.



He *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first planta *Monstrous Imagination*, Which afterwards was, by the *Schoole* of *Pluto*, and Others, Watred, and Nourished. It was, that the *World* was *One, Entire, Perfect, Liuing Creature*; Inſomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing and Flowing* of the *Sea*, was the *Reſpiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Liuing Creature*, it had a *Soule*, and *Spirit*; Which alſo they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* beſides;) But only

Experiments
in Conſort
touching the
Transmigration,
and *Influx*, of
Inordinate
Fertiles, and the
Force of *Imagi-*
nation.

only the *Soule*, or *Essentiall Forme* of the *Vniuerse*. This *Foundation* being laid, they mought build vpon it, what they would; For in a *Liuing Creature*, though neuer so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcurfion* thoroughout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that, (for Example,) wee mought here in *Europe*, haue *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, without, and against *Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnitie* and *Harmonie* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosome*,) doe giue a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beliefes*, it might command *Nature*; For *Paracelsus*, and some darksome *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these *Vast* and *Bottomesse* *Follies*, *Men* haue been (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lampe*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all *Sobrietie*, and *Seueritie*, whether there be to be found, in the *Foot-steps* of *Nature*, any such *Transmission* and *Influx* of *Immaterial Vertues*; And what the *Force* of *Imagination* is; Either vpon the *Body Imaginant*, or vpon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in *Purging* the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either *Contemned*, or *Condemned*. And although wee shall haue occasion to speake of this in more *Places* than *One*, yet we will now make some *Entrance* therinto.

Experiments
in Consort,
Monitory, touch-
ing Trans-
mission of Spirits,
and the Force
of Imagination.

Men are to be *Admonished*, that they doe not with-draw *Credit*, from the *Operations* by *Transmission* of *Spirits*, and *Force* of *Imagination*, because the *Effects* faile sometimes. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that

the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repelled, and wrought out, before it be formed into a *Disease*; So much more in *Impression* from *Mind* to *Mind*, or from *Spirit* to *Spirit*, the *Impression* taketh, but is Encountred, and Overcome, by the *Mind* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore, they worke most vpon *Weak* *Minds*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescis quis teneros Oculis mihi fascinat Agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weaknesse* of the *Power* of them, vpon *Kings*, and *Magistrates*; It may be ascribed, (besides the maine, which is the *Protection* of *God*, ouer those that Execute his *Place*;) to the *Weaknesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a *Beleeve*, that they can hurt such *Persons*.

Men are to be *Admonished*, on the other side, that they doe not easily giue *Place* and *Credit* to these *Operations*, because they *Succeed* many times; For the *Cause* of this *Success*, is (oft) to be truly ascribed, vnto the *Force* of *Affection* and *Imagination*, vpon the *Body Agent*; And then by a *Secondary Meanes*, it may worke vpon a *Diuers Body*: As for Example; If a *Man* carry a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeuing strongly, that it will helpe him to obtaine his *Loue*; Or to keepe him from danger of hurt in *Fight*; Or to preuaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident*, and *Perfising*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseuerance*, (especially in *Ciuill Businesse*;) who knoweth not? For wee see *Audacitie* doth almost binde and mate the weaker *Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and neuer to giue ouer, doth *Wonders*: Therefore, it were a *Meere Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, vpon another *Body*, which is but the *Force* of *Imagination* vpon the *Proper Body*: For there is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly vpon the *Body* of the *Imaginant*: As wee shall shew in due place.

Men are to be *Admonished*, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as diuers wise *Iudges* haue prescribed, and cautioned, *Men* may not too rashly beleeue, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeue oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the *Observing*, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the *Meetings* of *Witches* that haue beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into

other Bodies; &c. are still reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Anointing* themselves all over. This may iustly moue a *Man* to thinke, that these *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, shut in the *Vapours*, and send them to the *Head* extremely. And for the Particular *Ingredients* of those *Magickall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Anointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, we know is vsed for *Procuring Dead sleepes*: And if any *Man* say, that this *Effect* would be better done by *Inward Potions*; Answer may be made, that the *Medicines*, which goe to the *Ointments*, are so strong, that if they were vsed inwards, they would kill those that vse them: And therefore they worke Potently, though Outwards.

We will diuide the Seuerall Kindes of the *Operations*, by *Transmission* of *Spirits*, and *Imagination*; Which will giue no small Light to the *Experiments* that follow. All *Operations* by *Transmission* of *Spirits*, and *Imagination* haue this; That they *Worke at Distance*, and not at *Touch*; And they are these being distinguished.

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The First is the *Transmission* or *Emission*, of the *Thinner*, and more *Airy Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the rest, the most *Corporeall*. But you must remember withall, that there be a Number of these *Emissions*, both *Wholesome*, and *Unwholesome*, that giue no *Smell* at all: For the *Plague*, many times, when it is taken, giueth no *Sense* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other *Proofoes*, that differ not in *Smell* from other *Aires*. And vnder this Head, you may place all *Imbibitions* of *Aire*, where the *Substance* is *Materiall*, *Odour like*; Whereof some neuertheless are strange, and very suddenly d *flused*; As the *Alteration*, which the *Aire* receiueth in *Egypt*, almost immediately, vpon the *Rising* of the *Riuer of Nilus*, whereof we haue spoken.

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The Second is the *Transmission* or *Emission* of those *Things* that wee call *Spirituell Species*; As *Visibles*, and *Sounds*: The one whereof wee haue handled; And the other we shall handle in due place. These moue swiftly, and at great distance; But then they require a *Medium* well disposed; And their *Transmission* is easily stopped.

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The Third is the *Emissions*, which cause *Attraction* of *Certaine Bodies* at *Distance*; Wherein though the *Lodestone* be commonly placed in the *First Rank*, yet we thinke good to except it, and referre it to another *Head*: But the *Drawing* of *Amber*, and *Iet*, and other *Electrick Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Siluer*, at distance; And the *Attraction* of *Heat* at distance; And that of *Fire* to *Naphtha*; And that of some *Herbs* to *Water*, though at distance; And diuers others; We shall handle, but yet not vnder this present *Title*, but vnder the *Title* of *Attraction* in generall.

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The Fourth is the *Emission* of *Spirits*, and *Immaterial Powers* and *Vertues*, in those Things, which worke by the *Vniuersall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influences*, (as is usually taught and receiued,) but by the *Primitive Nature* of *Matter*, and the *Seeds of Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe of the Earth*: Of this Kinde is the *Motion of Gravity*, which is by *Consent* of *Dense Bodies*, with the *Globe of the Earth*: Of this kinde is some *Disposition of Bodies* to *Rotation*, and particularly from *East to West*: Of which kinde we conceiue the *Maine Vleat* and *Re-vleat* of the *Sea* is, which is by *Consent* of the *Vaiuerse*, as *Part* of the *Diurnall Motion*. These *Immaterial Vertues* haue this Property differing from Others; That the *Diuersity* of the *Medium* hindreth them not; But they passe through all *Mediums*; yet at *Determinate distances*. And of these we shall speake, as they are incident to seuerall *Titles*.

The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde of Man*, vpon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be *Vehement*; And the *Operation* of the *Imagination*, if it be *Strong*. But these two are so *Coupled*, as we shall handle them together: For when an *Enuious*, or *Amorous Affect*, doth infect the *Spirits* of Another, there is Ioynd both *Affection*, and *Imagination*.

The Sixth is, the *Influxes* of the *Heauenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

The Seuenth is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* haue brought into an *Art*, or *Precept*: And it is this; That if you desire to Super-induce any *Vertue* or *Disposition*, vpon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Again, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Coeke*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Coeke*: Take those *Parts* immediately after the *Lion*, or the *Coeke* haue beene in *Fight*; And let them be worne, vpon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake vnder this present *Title*.

The Eighth and last is, an *Emission* of *Immaterial Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly aouched by many: And wee haue set it downe, as a *Law* to our Selues, to examine things to the Bottom; And not to receiue vpon Credit, or reject vpon Improbabilities, vntill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as

there is a *Sympathy of Species*; So, (it may be) there is a *Sympathy of Individuals*: That is, that in *Things*, or the *Parts of Things*, that haue beene once *Contiguous*, or *Entire*, there should remaine a *Transmission of Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation of Frequentum Teli*: And so of a *Pecke of Lard*, or *Sticke of Elder*, &c. that if *Part* of it be Consumed or Purified, it will worke ypon the other *Part Seuered*. Now wee will pursue the *Instances* themselves.

Experiments
in Confort,
touching Emis-
sion of Spirits
in Vapors, or
Exhalation, O-
dour-like.

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The *Plague* is many times taken without *Manifest Sense*, as hath beene said. And they report, that where it is found, it hath a *Sent*, of the *Smell* of a *Mellow Apple*; And (as some say) of *May-Flowers*: And it is also receiued, that *Smells of Flowers*, that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

The *Plague* is not easily receiued by such, as continually are about them, that haue the *Plague*; As *Keepers of the Sicke*, and *Physicians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Loafe* and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoary*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume;) Nor againe by *Old People*, and such as are of a *Dry and Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Fasting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

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The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Prisoners* haue beene Long, and Close, and Nastily kept; Whereof we haue had, in our time, Experience, twice or thrice; when both the *Judges* that sate vpon the *Iayle*, and Numbers of those that attended the *Businesse*, or were present, *Sickned* vpon it, and *Died*. Therefore it were good wisdom, that in such Cases, the *Iayle* were Aired, before they be brought forth.

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Out of question, if such *Foule Smells* be made by *Art*, and by the *Hand*, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinckes*, which the *Nostrils* streight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as haue some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger, in vsing such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning of Aire* is no lesse dangerous than *Poysoning of Water*; Which hath beene vsed by the *Turkes* in the *Warres*; And was vsed by *Emanuel Commenus* towards the *Christians*, when they passed thorow his *Countrie* to the *Holy Land*. And these *Empoisonments of Aire*, are the more dangerous in *Meetings of People*; Because the rough *Breath* of People, doth further the *Reception* of the *Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

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The *Empoisonment* of Particular Persons, by *Odoours*, hath beene reported

not to be in *Perfumed Glasses*, or the like: And it is like, they Mingle one with another that is deadly, with some *Smells* that are Sweet, which also make that the former received. *Plaques* also have been raised by *Annoyances* of the *Cholicks* of *Dawres*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet vpon their Fingers, to put them to their *Nose*; Which *Men* therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious* *Aires*, cannot be made without *Danger* of *Death*, to them that make them. But when againe, they may haue some *Antidotes* to saue themselves; So that *Men* ought not to be secure of it.

There haue beene, in diuers *Countries*, great *Plaques*, by the *Purification*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they haue beene dead, and cast vpon Heaps.

It hapneth oft in *Mines*, that there are *Damps*, which kill, either by *asphyxiation*, or by the *Poisonous Nature* of the *Minerall*: And those that drinke much in *Refining*, or other *Workes* about *Metals*, and *Minerals*, haue their *Braines* Hurt and Stupefied by the *Metallicke Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, euer fly to the *Skull*, *Teeth*, or *Eares*; In so much as *Gilders* vse to haue a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Mueruus*, that *Poyson Birds*, (as is said,) which fly ouer them; Or *Men*, that stay too long about them.

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close *Roome*, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But Realeth on by little and little; Enducing only a *Faintnesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more *Sticks*, they fell to make *Fire* of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a *Generall Silence*, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a *Swoone*; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saued themselves. The *Effect* (no doubt) is wrought by the *Impassation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plastered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Ioninianus* Died.

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, vpon the *First Showers*, after long *Drought*.

It hath come to passe, that some *Apothecaries*, vpon *Stamping* of *Coliquintida*, haue beene put into a great *Skouring*, by the *Vapour* onely.

It hath beene a *Praetise*, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it prouoketh a *Continuall Sneezing*, in those that are in the *Roome*.

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Saund-Eyes*; And that a *Menstruous Woman*, looking vpon a *Glasse*, doth rust it. Nay they haue

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haue an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going ouer a *Field*, or *Garden*, doe *Corne* and *Herbes* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if he see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925 *Perfumes* Conuenient doe dry and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Mary* dryed, and *Lignum Aloës*, and *Calamus*, taken at the *Mouth*, and *Nostrils*; And no doubt there be other *Perfumes*, that doemoisten, and refresh; And are fit to be vsed in *Burning Agues*, *Consumptions*, and too much *Wakefulness*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaues* of *Vines* sprinckled with a little *Rose-Water*, &c.

926 They doe vse in *Sudden Faintings*, and *Swoonings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are vpon point to resolute, and fall away.

927 *Tobacco* comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by *Opening*; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to try the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to dry, and comfort, as for other *Intentions*. I wish *Triall* be made of the *Drying Fume*, of *Rose-Mary*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath been approued, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her *Sweet Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because *Ploughing* is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned vp, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling vpon a *Cushion*, and *Weeding*. And these *Things* you may practise in the best *Seasons*; Which is euer the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too *Moist*. I knew a great *Man*, that liued *Long*, who had a *Cleane Glod* of *Earth*, brought to him euery *Morning*, as he sate in his *Bed*; And he would hold his *Head* ouer it, a good pretty while. I Commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Provided alwaies, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They haue, in *Physicke*, Vse of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Prouoking* of *Sleepe*, &c. For though those *Things* be not so *Strong* as *Perfumes*, yet you may haue them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times; And besides, there be diuers *Things*, that breath better of themselves, than when they come to the *Fire*; As *Nigella Romana*, the *Seeds* of *Melanthium*, *Anomum*, &c.

There be two *Things*, which (inwardly vsed) doe Coole and condense the *Spirits*; And I with the same to be tried outwardly in *Vapours*. The One is *Aire*, which I would haue dissolued in *Malmesey*, or *Greece-Wine*, and so the *Smell* of the *Wine* taken; Or if you would haue it more forcible, poure it vpon a *Fire-pan*, well heated, as they doe *Rose-Water*, and *Fluagur*. The other is, the *Distilled Water* of *Wilde Pappy*; which I with to be mingled, at halfe, with *Rose-Water*, and so taken with some *Mixture* of a few *Cloues*, in a *Perfuming-Pan*. The like would be done with the *Distilled Water* of *Saffron Flowers*.

Smells of *Muske*, and *Amber*, and *Ciuit*, are thought to further *Venerous Appetite*: Which they may doe by the *Refreshing* and *Calling forth* of the *Spirits*.

Iuices, and *Niderous Smells*, (such as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to dispose *Men* to *Deuotion*: Which they may doe, by a kinde of *Sadnesse*, and *Contristation* of the *Spirits*: And partly also by *Heating*, and *Exalting* them. VVee see, that amongst the *Jewes*, the *Principall Perfume* of the *Sanctuary*, was forbidden all *Common vses*.

There be some *Perfumes*, prescribed by the *Writers* of *Naturall Magicke*, which procure *Pleasant Dreames*; And some others, (as they say,) that procure *Prophetickall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c.

It is certaine, that *Oodours* doe, in a small Degree, *Nourish*; Especially the *Odour* of *Wine*: And we see *Men* a hungred, doe loue to smell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the *House*, complaine, that she should be kept from being at a *Feast*, and *Solemnity*, (which she much desired to see,) because there would be a *Corps* in the *House*; Whereupon he caused *Loaves* of *Anew Bread* to be sent for, and opened them; And powred a little *Wine* into them; And so kept himselfe aline with the *Odour* of them, till the *Feast* was past. I knew a *Gentleman*, that would fast (sometimes) three or foure, yea six dayes, without *Meat*, *Bread*, or *Drinke*; But the same *Man* vsed to haue continually, a great *Wisse* of *Herbes*, that he smelled on: And amongst those *Herbes*, some *Esculent Herbs* of strong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like.

They doe vse, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by those *Ill Smells*, the *Rising* of the *Mother* is put downe.

There be *Aires*, which the *Physitians* aduise their *Patients* to remoue vnto, in *Consumptions*, or vpon *Reconery* of *Long Sicknesse*: Which (commonly) are *Plaine Champaignes*, but *Grasing*, and not *Ouer-growne* with *Heath*, or the like: Or else *Timber-Shades*, as in *Forrests*, and the like. It is noted also, that *Groues* of *Bayes* doe forbid *Pestilent Aires*; Which was accounted

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accounted a great Cause of the Wholefome Aire of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbes* of themselves; As *Wilde Thyme*; *Wilde Maioram*; *Penny-Roiall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discouer an *Excellent Aire*.

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It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will neuer be, if the *Roames* be *Low-roofed*, or full of *Windows*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Vnequall*; Which is a great Enemy to *Health*. The *Windows* also should not be high vp to the *Roofe*, (which is in vse for *Beautv*, and *Magnificence*), but *Low*. Also *Stone-Walls* are not wholefome; But *Timber* is more wholefome; And especially *Brick*. Nay it hath beene vsed by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment
S. litary touch-
ing the Emif-
fions of Spirituall
Species which
Affect the Sen-
fes.

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These *Emissions*, (as we said before,) are handled, and ought to be handled, by themselves, vnder their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to giue some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effectiue* of any Thing; Nor leaue no Worke behinde them; But are *Energies* meere; For their *Working* vpon *Mirrors*, and *Places of Echo*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Reper-cussed*. And as for the *Shaking* of *Windows*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake a Nature*, as they affect onely such a *Rare*, and *Attenuate Substance*, as is the *Spirit* of *Living Creatures*.

Experiments
in Consort,
touching the
Emission of Im-
mature Per-
tues from the
Minder, and
Spirits of Men,
either by affe-
ctions, or by
Imaginations, or
by other Im-
pressions.

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It is mentioned in some *Stories*, that where *Children* haue been *Exposed*, or taken away young from their *Parents*; And that afterwards they haue approached to their *Parents* presence, the *Parents*, (though they haue not knowne them,) haue had a *Secret Joy*, or Other *Alteration* thereupon.

There was an *Egyptian South-Sayer*, that made *Antonius* beleene, that his *Genius*, (which otherwise was *Brave*, and *Confident*), was, in the Presence of *Octavianus Caesar*, *Poore*, and *Cowardly*: And therefore, he aduised him, to abstain himselfe, (as much as he could,) and remoue far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him liue in *Egypt*, and other *Remote Places* from *Rome*. How-foeuer the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* ouer Another, is *Ancient*, and *Receiued still*, euen in *Vulgar Opin-ion*.

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There are Conceits, that some *Men*, that are of an *Ill*, and *Melancholly* Nature, doe incline the *Company*, into which they come, to be *Sad*, and *ill disposed*; And contrariwise, that Others, that are of a *Joviall* Nature, doe dispose the *Company* to be *Merry* and *Cheerfull*. And againe, that some *Men* are *Lucky* to be kept *Company* with, and *Employed*; And Others *Unlucky*. Certainly, it is agreeable to *Reason*, that there are, at the least, some *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Presence* one with another, as well as from *Body* to *Body*.

It hath beene obserued, that *Old Men*, who haue loued *Young Company*, and beene Conuerstant continually with them, haue beene of *Long Life*; That *Spirits*, (as it seemeth,) being Recreated by such *Company*. Such were the *Ancient Sophists*, and *Rhetoricians*; Which euer had *Fewng Auditors*, and *Disciples*; As *Gorgias*, *Protagoras*, *Isocrates*, &c. Who liued till they were an Hundred yeares Old. And so likewise did many of the *Grammarians*, and *Schoole Masters*; such as was *Orbilius*, &c.

Audacity and *Confidence* doth, in Ciuill Businesse, so great Effects, as a *Man* may (reasonably) doubt, that besides the very *Daring*, and *Earnestnesse*, and *Persisting* and *Importunity*, there should be some *Secret Binding*, and *Scooping* of other *Mens Spirits*, to such *Persons*.

The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And especially those *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Loue*, and *Enuy*, which is called *Oculus Malus*. As for *Loue*, the *Platonists*, (some of them,) goe so farre, as to hold that the *Spirit* of the *Louer*, doth passe into the *Spirits*, of the *Person Loued*; Which causeth the desire of *Returne* into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contact*, and *Coniunction*, which is in *Louers*. And this is obserued likewise, that the *Aspects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Enuy*, that emitteth some *Maligne* and *Poysonous Spirit*, which taketh hold of the *Spirit* of Another; And is likewise of greatest Force, when the *Cast* of the *Eye* is *Oblique*. It hath beene noted also, that it is most Dangerous, when an *Envious Eye* is cast vpon *Persons* in *Glory*, and *Triumph*, and *Ioy*. The *Reason* whereof is, for that, at such times, the *Spirits* come forth most, into the *Outward Parts*, and so meet the *Percussion* of the *Envious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* haue beene ill disposed, for some Daies following. We see the Opinion of *Fascination* is Ancient, for both Effects; Of Procuring *Loue*; And *Sickness* caused by *Enuy*: And *Fascination* is euer by the *Eye*. But yet if there be any such *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Presence*, and not by the *Eye* alone; Yet most Forcibly by the *Eye*.

Fear, and *Shame*, are likewise *Infective*; For we see that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewise *Blush* in his behalfe.

Now we will speake of the *Force of Imagination* vpon other *Bodies*; And of the *Meanes to Exalt and Strengthen* it. *Imagination*, in this Place, I vnderstand to be, the *Representation* of an *Indiuiduall Thought*. *Imagination* is of three Kinds: The First *Ioyned with Beleeve* of that which is to *Come*: The Second *Ioyned with Memory* of that which is *Past*: And the Third is of *Things Present*, or as if they were *Present*; For I comprehend in this, *Imaginations Faigned*, and at *Pleasure*; As if one should *Imagine* such a *Man* to be in the *Vestments* of a *Pope*; Or to haue *Wings*. I single out, for this time, that which is with *Faith*, or *Beleeve* of that which is to *Come*. The *Inquisition* of this *Subiect*, in our way, (which is by *Induction*,) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with *Extreme Caution*, for the *Reason* which wee will hereafter declare.

The *Power of Imagination* is in three Kindes; The First, vpon the *Body* of the *Imaginant*; Including likewise the *Childe* in the *Mothers Wombe*; The Second is, the *Power* of it vpon *Dead Bodies*, as *Plants, Wood, Stone, Metall, &c.* The Third is, the *Power* of it, vpon the *Spirits* of *Men*, and *Liuing Creatures*: And with this last we will onely meddle.

The *Probleme* therefore is, whether a *Man* *Constantly* and *Strongly Beleeuing*, that such a *Thing* shall be; (As that such an *One* will *Loue Him*; Or that such an *One* will *Grant him* his *Request*; Or that such an *One* shall *Recover a Sicknesse*; Or the like;) It doth helpe any thing to the *Effecting* of the *Thing* it selfe. And here againe we must warily distinguish; For it is not meant, (as hath beene partly said before,) that it should helpe by *Making* a *Man* more *Stout*, or more *Industrious*; (In which kinde a *Constant Beleeve* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard, (as we began to say,) to make any *New Experiment*; For I cannot *command* my *Selfe* to *Beleeue* what I will, and so no *Triall* can be made. Nay it is worse; For whatsoeuer a *Man* *Imagineth* doubtingly, or with *Feare*, must needs doe hurt, if *Imagination* haue any *Power* at all;

For

For a *Man* representeth that oftner, that he feareth, than the contrary.

The Helpe therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beliefe*, and not by *Himselfe*; Vntill *Himselfe* haue found by *Experience*, that *Imagination* doth preuaile; For then *Experience* worketh in *Himselfe* *Beliefe*; If the *Beliefe*, that such a *Thing* shall be, be ioyned with a *Beliefe*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in these Things; *That I saw a Kinde of Iugler, that had a Paire of Cards, and would tell a Man what Card he thought.* This Pretended Learned Man told me; It was a Mistaking in Me; For (*said he*) *it was not the Knowledge of the Mans Thought, (for that is Proper to God, but it was the Inforcing of a Thought upon him, and Binding his Imagination by a Stronger, that he could Thinke no other Card.* And thereupon he asked me a *Question*, or two, which I thought he did but cunningly, knowing before what vsed to be the *Feats* of the *Iugler*. Sir, (*said he*) *doe you remember whether he told the Card, the Man thought, Himselfe, or bade Another to tell it.* I answered (as was true;) *That he bade Another tell it.* Whereunto he said; *So I thought: For (said he) Himselfe could not haue put on so strong an Imagination; But by telling the other the Card, (who beleueed that the Iugler was some Strange Man, and could doe Strange Things,) that other Man caught a strong Imagination.* I harkened vnto him, thinking for a Vanity he spoke prettily. Then he asked me another *Question*: Saith he; *Doe you remember, whether he bad the Man think the Card first, and afterwards told the other Man in his Eare, what he should thinke, Or else that he did whisper first in the Mans Eare, that should tell the Card, telling that such a Man should thinke such a Card, and after bade the Man thinke a Card?* I told him, as was true; *That he did first whisper the Man in the Eare, that such a Man should thinke such a Card: Vpon this the Learned Man did much Exult, and Please himselfe, saying; Lee, you may see that my Opinion is right: For if the Man had thought first, his Thought had bene Fixed; But the other Imagining first, bound his Thought.* Which though it did somewhat sinke with mee, yet I made it Lighter than I thought, and said; *I thought it was Confederacy, betweene the Iugler, and the two Seruants: Though (Indeed) I had no Reason so to thinke: For they were both my Fathers Seruants; And he had neuer plaid in the House before. The Iugler also did cause a Garter to be held vp; And tooke vpon him, to know, that such a One, should point in such a Place, of the Garter; As it should be neare so many Inches to the Longer End, and so many to the Shorter; And sti'l he did it, by First Telling the Imaginer, and after Bidding the Actour Thinke.*

Hauiug told this *Relation*, not for the Weight thereof, but

because it doth handfomely open the *Nature* of the *Question*; I returne to that I said; That *Experiments* of *Imagination*, must be practised by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleeefe*: The First is *Experience*: The Second is *Reason*: And the Third is *Authoritie*: And that of these, which is farre the most *Potent*, is *Authoritie*: For *Beleeefe* vpon *Reason*, or *Experience*, will Stagger.

947

For *Authoritie*, it is of two Kindes; *Beleeefe* in an *Art*; And *Beleeefe* in a *Man*. And for Things of *Beleeefe* in an *Art*; A *Man* may exercise them by *Himselfe*; But for *Beleeefe* in a *Man*, it must be by *Another*. Therefore, if a *Man* beleeue in *Astrologie*, and finde a *Figure* Prosperous; Or beleeue in *Naturall Magicke*, and that a *Ring* with such a *Stone*, or such a *Pece* of a *Lining Creature*, Carried, will doe good; It may helpe his *Imagination*: But the *Beleeefe* in a *Man* is farre the more *Active*. But how-soeuer, all *Authoritie* must be out of a *Mans* Selfe, turned (as was said,) either vpon an *Art*, or vpon a *Man*: And where *Authoritie* is from one *Man* to another, there the Second must be *Ignorant*, and not *Learned*, or *Fill of Thoughts*; And such are (for the most part) all *Witches*, and *Superstitious Persons*; Whose *Beleeves*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reason*, or *Experience*: And vpon the same Reason, in *Magick*, they vse (for the most part,) *Boyes*, and *Young People*; whose *Spirits* easiliest take *Beleeefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three Wayes: The *Authoritie* whence the *Beleeefe* is deriued; *Meanes* to *Quickon* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refresh* it.

948

For the *Authoritie*, wee haue already spoken: As for the Second; Namely the *Meanes* to *Quickon*, and *Corroborate* the *Imagination*; Wee see what hath beene vsed in *Magick*; (If there be in those *Practises* any thing that is purely *Naturall*;) As *Vestments*; *Characters*; *Words*; *Scales*; Some *Parts* of *Plants*, or *Lining Creatures*; *Stones*; *Choice* of the *Hour*; *Gestures* and *Motions*; Also *Incenses*, and *Oodours*; *Choice* of *Societie*, which increaseth *Imagination*; *Dicets* and *Preparations* for some time before. And for *Words*, there haue beene euer vsed, either *Barbarous Words*, of no Sense, lest they should disturbe the *Imagination*; Or *Words* of *Similitude*, that may second and feed the *Imagination*: And this was euer as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are vsed also *Scripture Words*; For that the *Beleeefe*, that *Religious Texts*, and *Words*, haue Power, may strengthen the *Imagination*. And for the same Reason, *Hebrew Words*, (which amongst vs is counted the *Holy Tongue*, and the *Words* more *Mysticall*.) are often vsed.

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For the *Refreshing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) Wee see the *Practises* of *Magick*, as in *Images* of *Wax*, and

and the like, that should Melt by little, and little ; Or some other *Things Buried in Smoke*, that should Putrifie by little and little ; Or the like : For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *imperiall* and *Immateriall* a *Virtue*, as to worke at great *Distance* ; Or through all *Mediums* ; Or vpon all *Bodies* : But that the *Distance* must be Competent ; The *Medium* not Aduerse ; And the *Body* Apt and Proportionate. Therefore if there be any Operation vpon *Bodies*, in Absence, by Nature ; it is like to be conueyed from *Man* to *Man*, as *Fame* is ; As if a *Witch*, by *Imagination*, should hurt any afaire off, it cannot be naturally, but by Working vpon the *Spirit* of some, that commeth to the *Witch* ; And from that *Party* vpon the *Imagination* of *Another* ; And so vpon *Another* ; till it come to one that hath resort to the *Party Intended* ; And so by *Him* to the *Party intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Pece* of the *Garment*, or the *Name* of the *Party*, or the like ; yet there is lesse Credit to be giuen to those Things, except it be by Working of euill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, vpon other *Bodies*, are few, or none : For the *Experiments* of *Witchcraft*, are no cleare *Proofes* ; For that they may be, by a Tacite Operation of *Maligne Spirits* : We shall therefore be forced, in this *Enquire*, to resort to *New Experiments* : Wherein wee can giue only *Directions* of *Trialls*, and not any *Positiue Experiments*. And if any *Man* thinke, that wee ought to haue staied, till wee had made *Experiment*, of some of them, our selues, (as wee doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* vpon other *Bodies*, haue so little Credit with vs, as we shall crie them at leisure : But in the meane Time, we will lead others the way.

When you worke by the *Imagination* of *Another*, it is necessary, that He, by whom you worke, haue a *Precedent Opinion* of you, that you can doe Strange Things ; Or that you are a *Man of Art*, as they call it ; For else the Simple *Affirmation* to *Another*, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

It were good, because you cannot discern fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did vse the *Imagination* of more than *One* ; That so you may light vpon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Seruants*, that their *Master* shall surely recouer.

The *Imagination* of *One*, that you shall vse, (such is the Variety of *Mens Mindes*,) cannot be alwaies alike *Constant*, and *Strong* ; And if the

Successe

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Successes follow not speedily, it will faint and leese *Strength*. To remedy this, you must pretend to Him, whose *Imagination* you vse, severall *Degrees* of *Meanes*, by which to *Operate*; As to prescribe him, that every three Dayes, if he finde not the Successes Apparent, he doe vse another *Root*, or *Part* of a *Beast*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seven Times. Also you must prescribe a good Large Time for the *Effect* you promise; As if you should tell a *Servant* of a *Sick-Man*, that his *Master* shall recover, but it will be Fourteene daies, ere he findeth it apparently, &c. All this to entertaine the *Imagination*, that it waier lesse.

954

It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenses* and *Perfumes* taken at the *Nostrills*; And *Ointments* of some *Parts*; doe (naturally) worke vpon the *Imagination* of Him that taketh them. And therefore it must needs greatly *Cooperate* with the *Imagination* of him, whom you vse, if you prescribe him, before he doe vse the *Receit*, for the *Worke* which he desireth, that he doe take such a *Pill*, or a *Spoonfull* of *Liquour*; Or burne such an *Incense*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with such an *Ointment*, or *Oyle*: And you must chuse, for the *Composition* of such *Pill*, *Perfume*, or *Ointment*, such *In redients*, as doe make the *Spirits*, a little more *Grosse*, or *Muddy*: Whereby the *Imagination* will fix the better.

955

The *Body Passive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*), is better wrought vpon, (as hath beene partly touched,) at some *Times*, than at others: As if you should prescribe a *Servant*, about a *Sick Person*, (whom you haue possessed, that his *Master* shall recover, when his *Master* is fast asleepe, to vse such a *Root*, or such a *Root*. For *Imagination* is like to worke better vpon *Sleeping Men*, than *Men Awake*, As wee shall shew when we handle *Dreames*.

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We finde in the *Art of Memory*, that *Images Visible*, worke better than other *Conceits*: As if you would remember the Word *Philosophy*, you shall more surely doe it, by *Imagining* that such a *Man*, (For *Men* are best *Places*,) is reading vpon *Aristotiles Physickes*; Than if you should Imagine him to say; *He goe study Philosophy*. And therefore, this *Observation* would be translated to the *Subject* wee now speake of: For the more *Lustrous* the *Imagination* is, it filleth and fixeth the better. And therefore I conceiue, that you shall, in that *Experiment*, (whereof wee spake before,) of *Binding of Thoughts*, lesse faile, if you tell One, that such an *One* shal name one of *Twenty Men*, than if it were *One of Twenty Cards*. The *Experiment of Binding of Thoughts*, would be Diuersified, and tried to the Full: And you are to note, whether it hit for the most part, though not alwaies.

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It is good to consider, vpon what *Things*, *Imagination* hath most *Force*: And the *Rule*, (as I conceiue,) is, that it hath most *Force* vpon *Things*, that haue the *Lightest*, and *Easiest Motions*. And therefore aboue all, vpon the *Spirits* of *Men*: And in them, vpon such *Affections*, as moue *Lightest*; As vpon *Procuring* of *Loue*; *Binding* of *Lust*, which is

cuer

ever with *Imagination*; vpon *Men in Heare*; Or *Men in Irresolution*; And the like, Whatsoever is of this kinde would be thoroughly enquired. *Triall*s likewise would be made vpon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Dye this yeare; And will him, at these and these times, to goe vnto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*, or *Casting* of *Dice*, are very *Light Motions*; And there is a *Body* very vsuall, that *Gamessters* imagine, that some that stand by them, bring them ill Lucke. There would be *Triall* also made, of holding a *Ring* by a *Thread* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such a *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*, And howsoever I haue no *Opinion* of these things, yet so much I conceiue to be true; That *Strong Imagination* hath more Force vpon *Things Liuing*, Or that haue been *Liuing*, than *Things* meetely *Inanimate*: And more Force likewise vpon *Light*, and *Subtill Motions*, than vpon *Motions Vehement*, or *Ponderous*.

It is an vsuall *Observation*, that if the *Body* of One *Murdered*, be brought before the *Murderer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, vpon the Presence of the *Murderer*, hath opened the *Eyes*; And that there haue beene such like *Motions*, as well where the *Party Murdered* hath beene *Strangled*, or *Drownded*, as where they haue beene *Killed by Wounds*. It may be, that this participateth of a *Miracle*, by Gods Iust Iudgement, who vsually bringeth *Murders* to *Light*: But if it be *Naturall*, it must be referred to *Imagination*.

The *Tying* of the *Point* vpon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as we haue formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceiue it to haue the lesse Affinity with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it.

There be many *Things*, that worke vpon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Precious Stones*, worne, haue benee anciently and generally Receiued; And curiously assigned to worke seuerall *Effects*. So much is true; That *Stones* haue in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may worke by *Consent* vpon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth* *Oriental*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifest, that *Light*, aboue all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is very probable, that *Light Varied* doth the same *Effect*, with more *Newely*. And this is one of the *Causes*, why *Precious Stones* comfort, And therefore it were good to haue *Tincted Lanthornes*,
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Experiments
in Confort,
touching the
Secret Vertue of
Sympathy, and
Antipathy.

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or *Tincted Skreenes*, of *Glasſe Coloured* into *Greene*, *Blew*, *Carnation*, *Crimſon*, *Purple*, &c. And to uſe them with *Candles* in the *Night*. So likewiſe to haue *Round Glaſſes*, not onely of *Glaſſe Coloured thorow*, but with *Colours* laid betweene *Cryſtals*, with *Handles* to hold in ones *Hand*. *Prifmes* are alſo *Comfortable Things*. They haue of *Paris-Worke*, *Looking-Glaſſes*, bordered with broad *Borders* of ſmall *Cryſtall*, and great *Counterfeit Pretious Stones*, of all *Colours*, that are moſt *Glorious* and *Pleasant* to behold; Eſpecially in the *Night*. The *Pictures* of *Indian Feathers*, are likewiſe *Comfortable*, and *Pleasant* to behold. So alſo *Faire* and *Cleare Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Eſpecially when the *Sunne* is not *Glaring*, but *Ouercaſt*; Or when the *Moon* ſhineth.

961 There be diuers *Sorts of Bracelets* ſit to *Comfort* the *Spirits*; And they be of *Three Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wiſh them to be of *Pearle*, or of *Corall*, as is uſed: And it hath bene noted that *Corall*, if the *Party* that weareth it be ill diſpoſed, will wax *Pale*: Which I beleene to be true, becauſe otherwiſe *Diſtemper of Heat* will make *Corall* loſe *Colour*. I commend alſo *Beads*, or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with ſome *Cordiall Mixture*.

962 For *Corroboration* and *Conſortation*, take ſuch *Bodies* as are of *Aſtringent Quality*, without *Manifeſt Cold*. I commend *Bead-Amber*; which is full of *Aſtriction*, but yet is *Volatuous*, and not *Cold*; And is conceiued to *Impinguate* thoſe that wear ſuch *Beads*: I commend alſo, *Beads of Hartshorne*, and *Iuory*, which are of the like *Nature*; Alſo *Orange-Beads*; Alſo *Beads of Lignum Aloes*, *Macerated* firſt in *Rose-Water*, and *Dried*.

963 For *Opening*, I commend *Beads*, or *Pieces* of the *Roots* of *Carduus Beneditus*: Alſo of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964 The *Crampe*, (no doubt,) commeth of *Contraction* of *Sinnewes*; Which is *Manifeſt*, in that it commeth either by *Cold*, or *Drineſſe*; As after *Conſumptions*, and *Long Agues*: For *Cold* and *Drineſſe* doe (both of them) *Contract*, and *Corrugate*. We ſee alſo, that *Chafing* a little about the *Place* in paine, eaſeth the *Crampe*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in uſe, for the *Preuention* of the *Crampe*, two *Things*; The one *Rings* of *Sea-Horſe Teeth*, worne vpon the *Fingers*; The other *Bands* of *Greene Periwinkle*, (the *Herbe*), tied about the *Cuſe* of the *Leg*, or the *Thigh*, &c. where the *Crampe* uſeth to come. I doe finde this the more ſtrange, becauſe Neither of theſe haue any *Relaxing Vertue*, but rather the *Contrary*. I iudge therefore, that their *Working*, is rather vpon the *Spirits*, within the *Nerves*, to make them ſtrive leſſe; Than vpon the *Bodily Subſtance* of the *Nerves*.

965 I would haue *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trachiſch* of *Vipers*, made into little *Pieces* of *Beads*; For ſince they doe great *Good* Inwards, (eſpecially for *Peſtilent Agues*), it is like they will be *Effectuall* Outwards; Where they may be applied in greater *Quantity*. There would be *Trachiſch* likewiſe made

made of *Snakes*; Whose *Flesh* dried, is thought to haue a very *Opening*, and *Cardiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cardiall Confection Alkermes*: The *Beads* would be made vp with *amber-Grice*, and some *Pomander*.

It hath beene long receiued, and confirmed by diuers *Trialls*; That the *Root* of the *Male-Piony*, dried, tied to the *Necke*, doth helpe the *Falling-Sickenesse*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therefore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I iudge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c.

There is a *Stone*, which they call the *Blond-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quare*, if the *Stone* taken out of the *Toads Head*, be not of the like *Vertue*? For the *Toade* loueth *Shade*, and *Coolnesse*.

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*, and the *Garland* of *Periwinkle*, how that those things, which assuage the *Strife* of the *Spirits*, doe helpe diseases, contrary to the *Intention* desired: For in the *Curing* of the *Crampe*, the *Intention* is to relax the *Sinewes*; But the *Contraction* of the *Spirits*, that they strue lesse, is the best *Helpe*: So to procure easie *Transiles* of *Women*, the *Intention* is to bring downe the *Childe*; But the best *Helpe* is, to stay the *Comming* downe too fast: Whereunto they say, the *Toad Stone* likewise helpeth. So in *Pestilent Fevers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evaporation*; But the best *Meanes* to doe it, is by *Nitre*, *Discordium*, and other *Cool* Things, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; In the *Quenching* of the *Flame* of a *Pestilent Ague*, *Nature* is like *People*, that come to quench the *Fire* of a *House*; which are so busie, as one of them letteth another. Surely, it is an *Excellent Axiome*, and of *Manifold Use*, that whatsoeuer appealeth the *Contention* of the *Spirits*, furthereth their *Action*.

The *Writers* of *Naturall Magick*, commend the *Wearing* of the *Spoile* of a *Snake*, for *Preseruing* of *Health*. I doubt it is but a *Conceit*; For that the *Snake* is thought to renew her *Youth*, by *Casting* her *spoile*. They might as well take the *Beake* of an *Eagle*, or a *Peece* of a *Harts-Horne*, because those *Renue*.

It hath beene *Anciently Receiued*, (For *Pericles* the *Athenian* vsed it,) and it is yet in *use*, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preseruatiues* against the *Plague*: Not as they conceiue, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysens* themselves, they draw the *Venome* to them, from the *Spirits*.

Vide the *Experiments* 95. 96. and 97. touching the *Generall Symptomatics*, and *Antipathies*, for *Medicinall Use*.

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It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacity*, and *Disgestion*; And so, it may be, the *Parts* of him comfort the *Bowels*.

973

We see *Scare-Crowes*, are set vp to keep *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hang'd vp in a *Doce-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with vs, know *Dogs* better than *Wolues*.

974

The *Braines* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memory*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it seemeth, to be incident to the *Braines* of those *Creatures*, that are *Fearfull*.

975

The *Ointment*, that *Witches* vse, is reported to be made, of the *Fat* of *Children*, digged out of their *Graues*; Of the *Iuyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose that the *Soporiferous Medicines* are likeliest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaues*, &c.

976

It is reported by some, that the *Affections* of *Beasts*, when they are in *Strength*, doe adde some *Vertue*, vnto *Inanimate Things*; As that the *Skin* of a *Sheepe*, deuoured by a *Wolfe*, moueth *Itching*; That a *Stone*, bitten by a *Dog* in *Anger*, being throwne at him, drunke in *Powder*, prouoketh *Choler*.

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It hath bene obserued, that the *Diet* of *Women* with *Childe*, doth worke much vpon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to repress and stay *Vapours*, that ascend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrary side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be giuen to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunaticke*, or of *Imperfect Memory*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.

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The *Writers* of *Naturall Magicke* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audacity*. It is true, that the *Ape* is a *Merry* and *Bold Beast*. And that the same *Heart* likewise of an *Ape*, applied to the *Necke*, or *Head*, helpeth the *Wit*; And is good for the *Falling-Sickness*: The *Ape* also is a *Witty Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to moue *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens Mindes* to vse it; Except it be in such as weare the *Reliques* of *Saints*.

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The *Flesh* of a *Hedge-Hog*, Dressed, & Eaten, is said to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, must needs be *Harsh*, and *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of

Prickles,

prickles, are generally Dry : As *Briars*, *Thornes*, *Berberries* : And therefore the *Ashes* of a *Hedge-Hog* are said to be a great *Desiccative* of *Fistula's*.

Mummy hath great force in *Stanching* of *Bloud* ; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous* ; So it may also partake of a *Secret Propriety* ; In that the *Bloud* draweth *Mans Fleish*. And it is approved, that the *Mosse*, which groweth vpon the *Skall* of a *Dead Man*, vnburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, seuered from the *Water*, and *Dried*.

It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Juyce*, that putteth forth the *Feathers* afterwards, more *Penurious*. And it may be, the *Annointing* of the *Egs*, will be as *Effectuall*, as the *Annointing* of the *Body* ; Of which *Vide* the *Experiment* 93.

It is reported, that the *White* of an *EGge*, or *Blond*, mingled with *Salt-Water*, doth gather the *Salineesse*, and maketh the *Water* sweeter. This may be by *Adhesion* ; As in the 6. *Experiment* of *Clarification* : It may be also, that *Bloud*, and the *White* of an *EGge*, (which is the *Master* of a *Liuing Creature*.) haue some *Sympathy* with *Salt* : For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut Finger*, healeth it ; So as it seemeth *Salt* draweth *Blond*, as well as *Bloud* draweth *Salt*.

It hath beene anciently receiued, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the *Body*.) and erodeth them. Whereof the *Cause* is conceiued to be, a *Quality* it hath of *Heating* the *Breath*, and *Spirits* ; As *Cantharides* haue vpon the *Watry Parts* of the *Body* ; As *Frine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoeuer hath an *Operation* vpon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most vpon those *Parts*, wherein that *Kinde* of *Matter* aboundeth.

Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Aliue*, and when it is *Sound* ; And with those *Parts* which doe *Excerne* : As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man* ; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Ulcers*, *Carbuncles*, *Pockes*, *Scabs*, *Leprousie*, to *Sound Fleish* ; And the *Excrement* of euery *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse *Pernicious* than the *Corruptions*.

It is a *Common Experience*, that *Dogs* know the *Dog-Killer* ; When as in times of *Infection*, some *Petty Fellow* is sent out to kill the *Dogges* ; And that, though they haue neuer seene him before, yet they will all come forth, and barke, and fly at him.

The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so vnertaine, as they require a great deale of *Examination*, ere wee conclude vpon them. I would haue it first throughly inquired, whether there be any *Secret Passages* of *Sympathy*, betweene

Persons of neare Bloud ; As Parents, Children, Brothers, Sisters, Nurse-Children, Husbands, Wives, &c. There be many Reports in *Historie*, that vpon the *Death* of *Persons* of such Nearenesse, *Men* haue had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to diuers *English Gentlemen* ; That my *Fathers* *House*, in the *Countrey*, was *Plastered* all ouer with *Blacke Mortar*. There is an *Opinion* abroad, (whether *Idle* or no I cannot say,) That *louing* and kinde *Husbands*, haue a *Sense* of their *Wives* *Breeding* *Childe*, by some *Accident* in their owne *Body*.

587

Next to those that are *Neare* in *Bloud*, there may be the like *Passage*, and *Insincks* of *Nature*, betweene great *Friends*, and *Enemies* : And sometimes the *Reuealing* is vnto Another *Person*, and not to the *Party* Himselfe. I remember *Philippus Comminens*, (a graue *Writer*;) reporteth ; That the *Arch-Bishop* of *Vienna*, (a *Reuerend Prelate*;) said (one day) after *Massé*, to *King Lewis* the eleuenth of *France* ; *Sir, your Mortall Enemy is dead* ; What time *Duke Charles* of *Burgundie* was *Slaine*, at the *Battell* of *Granson*, against the *Switzers*. Some triall also would be made, whether *Paſſ* or *Agreement* doe any thing ; As if two *Friends* should agree, that such a *Day* in euery *Weeké*, they being in farre *Distant Places*, should *Pray* one for Another ; Or should put on a *Ring*, or *Tablet*, one for anothers *Sake* ; Whether if one of them should breake their *Vow* and *Promise*, the other should haue any *Feeling* of it, in *Absence*.

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If there be any *Force* in *Imaginations* and *Affections* of *Singular Persons* ; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes* : As if a *Victorie* should be won, or lost, in *Remote Parts*, whether is there not some *Sense* thereof, in the *People* whom it concerneth ; Because of the great *Joy*, or *Griefe*, that many *Men* are posselt with, at once ? *Pius Quintus*, at the very time, when that Memorable *Victorie* was won, by the *Christians*, against the *Turks*, at the *Navall Battell* of *Lepanto*, being then hearing of *Causes* in *Consistorie*, brake off suddenly, and said to those about him ; *It is now more time, we should giue thanks to God, for the great Victorie he hath granted vs, against the Turks*. It is true, that *Victorie* had a *Sympathie* with his *Spirit* ; For it was merely his *Worke*, to conclude that *League*. It may be, that *Reuelation* was *Divine* ; But what shall wee say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans* ? Where the *People*, being in *Theaters* at *Playes*, haue had *Newes* of *Victories*, and *Ouerthrowes*, some few dayes, before any *Messenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superstition* : Namely, that *Men* obserue when *Things Hit*, and not when they *Missé* : And commit to *Memory* the one, And forget and passe ouer the other. But touching *Diuination*, and the *Misgiuing* of *Mindes*, wee shall

shall speake more, when wee handle in generall, the *Nature of Mindes, and Soules, and Spirits.*

Wee haue giuen formerly some *Rules of Imagination* ; And touching the *Fertifying* of the Same. Wee haue set downe also some few *Instances, and Directions*, of the *Force of Imagination*, vpon *Beasts, Birds, &c.* vpon *Plants* ; And vpon *Inanimate Bodies* : Wherein you must still obserue, that your *Trialls* be vpon *Subtill and Light Motions*, and not the contrary ; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying* : And I leaue it to euery *Man*, to choose *Experiments*, which himselfe thinketh most *Commodious* ; Giuing now but a few *Examples* of euery of the Three *Kindes*.

Vse some *Imaginant*, (obseruing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing* ; And the like of a *Dogge* from *Barking*. Tria also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more *Hardy*, and the other more *Cowardly*. It would be tried also, in *Flying* of *Hawkes* ; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-hounds* ; Or in *Horse-Races* ; And the like *Comparatiue Motions* : For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it ; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not run.

In *Plants* also, you may trie the *Force of Imagination*, vpon the *Lighter Sort of Motions* : As vpon the *Sudden Fading*, or *Liuely Comming* of *Herbs* ; Or vpon their *Bending* one way, or other ; Or vpon their *Closing*, and *Opening* ; &c.

For *Inanimate Things*, you may trie the *Force of Imagination*, vpon *Staying* the *Working* of *Beere*, when the *Barme* is put in ; Or vpon the *Commig* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in.

It is an *Ancient Tradition*, euery where alleaged, for *Example of Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long *Sticke*, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working at Distance*, to worke by the Continuance of a *Fit Medium* ; As *Sound* will be conueyed to the *Eare*, by striking vpon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*.

The *Writers of Naturall Magicke*, doe attribute much to the *Virtues*, that come from the *Parts of Liuing Creatures* ; So as they be taken from them, the *Creatures* remaining still aliue : As if the *Creature* still liuing did infuse some *Immateriall Vertue*, and *Vigour*, into the *Part Senered*. So much may be true ; that any *Part*, taken from a *Liuing Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *Selfe*, because it is fuller of *Spirits*.

Triall would be made, of the like *Parts of Individualls*, in *Plants*, and *Liuing Creatures* ; As to cut off a *Stocke* of a *Tree* ; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the *Rest* of the *Stocke* : Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*,
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or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is receiued, that it helpeth to *Continue Love*, if one weare a *Ring*, ora *Bracelet*, of the *Haire* of the *Party Beloued*. But that may be by the *Exciting* of the *Imagination* : And perhaps a *Glowe*, or other like *Fauour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that haue beene *Entire*, or haue *Touched*, is of all others the most *Incredible* : Yet according vnto our faithfull Manner of *Examination* of *Nature*, wee will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a *Common Experiment* : And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* vpon one of my *Fingers* : Afterwards when I was about Sixteene Yeeres old, being then at *Paris*, there grew vpon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Moneths Space. The *English Embassadors Lady*, who was a *Woman* farre from *Superstition*, told me, one day ; She would helpe me away with my *Warts* : Whereupon she got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all ouer, with the *Fat Side* ; And amongst the rest that *Wart*, which I had had from my *Childhood* ; Then she nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, vpon a *Post* of her *Chamber Window*, which was to the *South*. The *Successe* was, that within five weekes space, all the *Warts* went quite away : And that *Wart*, which I had so long endured, for *Company*. But at the rest I did little maruell, because they came in a *Short* time, and might goe away in a *Short Time* againe : But the *Going away* of that, which had staid so long, doth yet sicke with mee. They say the like is done, by the *Rubbing* of *Warts* with a *Greene Elder Sticke*, and then *Burying* the *Sticke* to *Rat* in *Mucke*. It would be tried, with *Cornes*, and *Wens*, and such other *Excreescences*. I would haue it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excreescences* ; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would haue it tried both wayes ; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before ; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume* ; To see whether it will *Worke* any *Effect*, towards the *Consumption* of that *Part*, which was once *loyned* with it.

998 It is constantly Receiued, and *Avouched*, that the *Anointing* of the *Wound*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, vpon the Relation of *Men of Credit*, (though my selfe, as yet, am not fully inclined to beleuee it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of *Diuers Ingredients* ; whereof the *Strangest* and *Hardest* to come by, are the *Mosse* vpon the *Skull* of a dead *Man*, *Enburied* ; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a *Starving Hple* ; That if the *Experiment* proued not, it might be pretended, that the *Beasts* were not killed in the due Time ;

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For as for the *Masse*, it is certaine, there's great Quantitie of it in *Ireland*, vpon *Slieve Bogles*, laid on *Heaps*, *Embarked*. The other *Ingredient*, are, the *Black Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Blood*; As also the *Masse* hath. And the *Description* of the whole *ointment* is to be found in the *Chymicall Dispensatorie of Crolius*. Secondly, the same *Kind* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but only applied to the *Weapon*. Thirdly, (which I like well) they doe not obserue the *Conjellation* of the *Ointment*, vnder any certaine *Conjellation*; which commonly is the *Excuse* of *Magickall Medicines*, when they faile, that they were not made vnder a *fiat* *Perfect Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fifthly, it seemeth the *Imagination* of the *Party*, to be *Cured*, is not needfull to *Concurre*; For it may be done, without the *Knowledge*, of the *Party Wounded*; And thus much hath bene tried, that the *Ointment* (for *Experiments* sake,) hath bene wiped off the *Weapon*, without the *knowledge* of the *Party Hurt*, and presently the *Party Hurt*, hath bene in great *Rage* of *Paine*, till the *Weapon* was *Reinforced*. Sixthly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Anointing* of that *Instrument* will seue, and worke the *Effe*. This I doubt should be a *Deuice*, to keepe this strange *Forme* of *Cure*, in *Request*, and *Vse*; Because many times you cannot come by the *Weapon* it selfe. Seuently, the *Wound* must be at first *Washed* cleane, with *White Wine*, or the *Parties* owne *Water*; And then bound vp Close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* vp Close, as farre as the *Ointment* goeth, that it taketh no *Wind*. Ninthly, the *Ointment*, if you wipe it off from the *Sword*, and keepe it, will *Serue* againe; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in *farre Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subiecteth the *Matter*, to an *Easie Trial*.

I would haue *Men* know, that though I reprehend, the *Easie Pasing* over, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden* *Virtues*, and *Proprieties*; (For this hath arreited, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not vnderstand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be *Cooling*; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receiue from *Experience*, that *Powder* of *Chamapys*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue

Experiment
Solitary touch-
ing Secret
Properties.

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All

Experiment
Solitary, touch-
ing the Gene-
rall Sympathy of
Mens Spirits.

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still the same *Medicine*, to a *Patient*; But he will vary, if the first *Medicine* doth not apparently succeed: For of those *Remedies*, that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not doe good in Another; According to the Correspondence the *Medicine* hath to the *Individuall Body*.

The *Delight* which *Men* have in *Popularity*, *Fame*, *Honour*, *Submission*, and *Subiection* of other *Mens* *Mind*s, *Wills*, or *Affections*, (although these *Things* may be desired for other *Ends*,) seemeth to be a *Thing*, in it selfe, without Contemplation of Consequence, Gratefull & agreeable to the *Nature* of *Man*. This *Thing* (surely) is not without some Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Else why should *Men* be so much affected with that, which others thinke, or say? The best Temper of *Mind*s desireth Good *Name*, and *True Honour*: The *Lighter*, *Popularity*, and *Applause*; The more depraved, *Subiection*, and *Tyranny*; As is seene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretic*kes; for the *Introducing* of new *Doctrines*, is likewise an *Affectation* of *Tyranny*, over the *Understandings*, and *Beliefes* of *Men*.

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NEW
ATLANTIS.

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Written by the Right Honourable, FRANCIS
Lord Verulam, Viscount St. Alban.



ST. PAUL'S

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NEW YORK





NEW ATLANTIS.

WEE sayled from *Peru*, (wher wee had continued by the space of one whole yeare,) for *China* and *Japan*, by the South Sea; taking with vs Victuals for twelue Moneths; And had good Windes from the East, though soft and weake, for fise Moneths space, and more. But then the Winde came about, and setled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne back. But then againe ther arose Strong and Great Windes from the South, with a Point East; which carried vs vp, (for all that we could doe) towards the North: By which time our Victualls failed vs, though we had made good spare of them. So that finding our selues, in the Midst of the greatest Wildernesse of Waters in the World, without Victuall, we gaue our Selues for lost Men, and prepared for Death. Yet we did lift vp our Harts and Voices to GOD aboue, who *sheweth his Wonders in the Deepe*; Beseeching him of his Mercy, that as in the *Beginning* He discouered the Face of the Deepe, and brought forth *Dry-Land*; So he would now discouer Land to vs, that we mought not perish. And it came to passe, that the next Day about Euening, we saw within a Kenning before vs, towards the North, as it were thick Cloudes, which did put vs in some hope of Land; Knowing how that part of the South Sea was vtterly vnknowne; And might haue Islands, or Continents, that hithertoo were not come to light.

Wherefore we bent our Course thither, wher we saw the Appearance of Land, all that night; And in the Dawning of the next Day, we might plainly discerne that it was a Land; Flatt to our sight, and full of Boscage; which made it shew the more Darke. And after an Houre and a halfe Sayling, we entred into a good *Hauen*, being the Port of a faire *Citty*; Not great indeed, but well built, and that gaue a pleasant view from the Sea: And we thinking euery Minute long, till we were on Land, came close to the Shore, and offred to land. But straightwayes we saw diuers of the People, with Bastons in their Hands, (as it were) forbidding vs to land; Yet without any Cries or Fiercenesse, but onely as warning vs off, by Signes that they made. Wherevpon being not a little discomforted, we were aduising with our selues, what we should doe. During which time, ther made forth to vs a small Boate, with about eight Persons in it; wherof One of them had in his Hand a Tipstaffe of a yellow Cane, tipped at both ends with Blew, who came aboard our Shipp, without any shew of Distrust at all. And when he saw one of our Number, present himselfe somewhat afore the rest, he drew forth a little Scroule of Parchment, (somewhat yellower then our Parchment, and shining like the Leaues of Writing Tables, but otherwise soft and flexible,) and deliuered it to our foremost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish*, these wordes; *Land yee not, none of you; And prouide to be gone, from this Coast, within sixteene daies, except you haue further time giuen you. Meane while, if you want Fresh Water, or Victuall, or helpe for your Sick, or that your Ship needeth repaire, write downe your wants, and you shall haue that, which belongeth to Mercy.* This Scroule was Signed with a Stampe of *Cherubins Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being deliuered, the Officer returned, and left onely a Seruant with vs to receyue our Answeare. Consulting hereupon amongst our Selues, we were much perplexed. The Deniall of Landing, & Hasty Warning vs away, troubled vs much; On the other
side

side, to finde that the People had Languages, and were so full of Humanity, did comfort vs not a little. And about all, the Signe of the *Crosse* to that Instrument, was to vs a great Reio- cing, and as it were a certaine Prefage of Good. Our Answer was in the *Spanish* tongue; That for our Shipp, it was well; For we had rather mett with Calmes, and contrary Windes, then any Tempests. For our Sick, they were many, and in every ill Case; So that if they were not permitted to Land, they ran danger of their Lives. Our other Wants we sett downe in particular, adding; That we had some little store of Merchandize, which if it pleased them to deale for, it might supply our Wants, without being chargeable vnto them. We offered some Reward in Pistolets vnto the Seruant, and a peece of Crimson Veluett to be presented to the Officer: But the Seruant tooke them not, nor would scarce looke vpon them; And so left vs, and went back in another little Boate, which was sent for him.

About three Houres after we had dispatched our Answer, ther came towards vs, a Person (as it seemed) of place. He had on him a Gowne with wide Sleeues, of a kinde of Water Chamolett, of an excellent Azure Colour, farre more glossy then ours: His vnder Apparell was Green; And so was his Hatt, being in the forme of a Turban, daintely made, and not so huge as the *Turkish* Turbans; And the Lockes of his Haire came downe below the Brimms of it. A Reuerend Man was he to behold. Hee came in a Boate, gilt in some part of it, with foure Persons more onely in that Boate; And was followed by another Boate, wherein were some Twenty. When he was come within a Flight-shott of our Shipp, Signes were made to vs, that we should send forth some to meet him vpon the Water; which we presently did in our Shipp-Boate, sending the principall Man amongst vs saue one, and foure of our Number with him. When we were come within sixe yards of their Boate, they called to vs to stay, and not to approach further; which we did. And therupon the Man, whom I before described, stood vp, and with a loud voice, in *Spanish*,

nish, asked; *Are yee Christians?* We answered; *We were*; fearing the lesse, because of the *Crosse* we had seen in the Subscription. At which Answer the said Person lift vp his Right Hand towards Heauen, and drew it softly to his Mouth, (which is the Gesture they vse, when they thank GOD;) And then said: *If yee will sweare, (all of you,) by the Merits of the SAVIOUR, that yee are no Pirates; Nor haue shed bloud, lawfully, nor unlawfully, within fourtie daies past; you may haue License to come on Land.* Wee said; *Wee were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a Notary, made an Entry of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boate, after his Lord had spoken a little to him, said aloud; *My Lord would haue you know, that it is not of Pride, or Greatnes, that he commeth not aboard your Shipp; But for that, in your Answer, you declare, that you haue many Sick amongst you, he was warned by the Conseruatour of Health, of the Citty, that he should keepe a distance.* We bowed our selues towards him, and answered; *Wee were his humble Seruants; And accounted for great Honour, and singular Humanity towards vs, that which was already done; But hoped well, that the Nature, of the Sicknes, of our Men, was not infectious.* So he returned; And a while after came the Notary to vs aboard our Ship; Holding in his hand a Fruit of that Cuntry, like an Orenge, but of colour between Orenge-tawney and Scarlett; which cast a most excellent Odour. He vsed it (as it seemeth) for a Preseruatiue against Infection. He gaue vs our Oath; *By the Name of Iesus, and his Merits:* And after told vs, that the next day, by sixe of the Clocke, in the Morning, we should be sent to, and brought to the *Strangers House*, (so he called it,) wher we should be accommodated of things, both for our VVhole, and for our Sick. So he left vs; And when we offered him some Pistolets, he smiling said; *He must not be twice paid, for one Labour:* Meaning (as I take it) that he had Salary sufficient of the State for his Seruice. For (as I after learned) they call an Officer, that taketh Rewards, *Twice-paid.*

The next Morning earely, ther came to vs the same Officer, that came to vs at first with his Cane, and told vs; *He came to conduct vs to the Strangers House; And that hee had prevented the Houre, because we might haue the whole day before vs, for our Businesse.* For (said he) *If you will follow my Advice, ther shall first goe with me some few of you, and see the place, and how it may be made conuenient for you; And then you may send for your Sick, and the rest of your Number, which yee will bring on Land.* We thanked him, and said; *That this Care, which he tooke of desolate Strangers, GOD would reward.* And so sixe of vs went on Land with him: And when we were on Land, he went before vs, and turned to vs, and said; *He was but our Seruant, and our Guide.* Hee ledd vs through three faire Streets; And all the way we went, ther were gathered some People on both sides, standing in a Rowve; But in so ciuill a fashion, as if it had beene, not to wonder at vs, but to welcome vs: And diuers of them, as we passed by them, put their Armes a little abroad; which is their Gesture, when they bid any welcome. The *Strangers House* is a faire and spacious House, built of Brick, of somewhat a blewver Colour then our Brick; And with handsome windowes, some of Glasse, some of a kinde of Cambrick oyl'd. He brought vs first into a faire Parlour aboute staires, and then asked vs; *What Number of Persons we were? And how many sick?* We answered, *We were in all, (sick and whole,) one and fifty Persons, whereof our sick were seuateene.* He desired vs to haue patience a little, and to stay till he came back to vs; which was about an Houre after; And then hee led vs to see the Chambers, which were provided for vs, being in number nineteene. They hauing cast it (as it seemeth) that foure of those Chambers, which were better then the rest, might receiue foure of the principall Men of our Company; And lodge them alone by themselves; And the other 15. Chambers were to lodge vs two and two together. The Chambers were handsome and cheerefull Chambers, and furnished ciuilly: Then he ledd vs to a long Gallery, like a Dorture, where hee

shewed vs all along the one side (for the other side was but VVall and VVindow,) seuateene Cells, very neat ones, having partitions of Cedar wood. VVhich Gallery, and Cells, being in all fourty, (many more then we needed,) were instituted as an Infirmary for sick Persons. And he told vs withall, that as any of our Sick waxed well, he might be remoued from his Cell, to a Chamber: For which purpose, there were sett forth ten spare Chambers, besides the Number we spake of before. This done, he brought vs back to the Parlour, and lifting vp his Cane a little, (as they doe when they giue any Charge or Commaund) said to vs; *Ye are to know, that the Custome of the Land requireth, that after this day, and too morrow, (which we giue you for remouing of your people from your Ship,) you are to keepe within dores for three daies. But lett it not trouble you, nor doe not think your selues restrained, but rather left to your Rest and Ease. You shall want nothing, and there are sixe of our People appointed to attend you, for any Busines you may haue abroad.* VVee gaue him thanks, with all Affection and Respect, and said; *GOD surely is manifested in this Land.* VVee offred him also twent, Pistolets; But he smiled, and onely saide; *What? twice paid!* And so he left vs. Soone after our Dinner was serued in; VVhich was right good Viands, both for Bread, and Meate: Better then any Collegiate Diett, that I haue knowne in *Europe*. VVe had also Drinke of three sorts, all wholesome and good; VVine of the Grape; A Drink of Graine, such as is with vs our Ale, but more cleare: And a kinde of Sider made of a Fruit of that Cuntry; A wonderfull pleasing and Refreshing Drink. Besides, ther were brought in to vs, great store of those Scarlett Orenge, for our Sick; which (they said) were an assured Remedy for sicknes taken at Sea. Ther was giuen vs also, a Boxe of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills, euery night before sleepe; which (they said) would hasten their Recoury. The next day, after that our Trouble of Carriage, and Remouing of our Men, and Goods, out of our Shipp, was somewhat settled and quiett, I thought good to call our
Company

Company together, and when they were assembled, said vnto them; My deare Friends; Let vs know our selues, and how it standeth with vs. We are Men cast on Land, as Ionas was, out of the Whales Belly, when we were as buried in the Deepe: And now we are on Land, wee are but between Death and Life; For we are beyond, both the Old World, and the New; And whether euer wee shall see Europe, GOD onely knoweth. It is a kinde of Miracle hath brought vs hither: And it must bee little lesse, that shall bring vs hence. Therefore in regard of our Deliueraunce past, and our danger present, and to come, let vs looke vpon GOD, and euery man reforme his owne wayes. Besides we are come here amongst a Christian People, full of Piety and Humanity: Let vs not bring that Confusion of face vpon our selues, as to shew our vices, or vniworthinesse before them. Yet there is more. For they haue by Commandement, (though in forme of Courtesie) Cloistered vs within these Walls for three dayes: Who knoweth, whether it be not, to take some tast of our manners and conditions? And if they finde them bad, to banish vs straight-wayes; If good to giue vs further time. For these Men, that they haue giuen vs for Attendance, may with all haue an eye vpon vs. Therefore for GODS loue, and as we liue the weale of our Soules and Bodies, let vs so behaue our selues, as we may be at peace with GOD, and may finde grace in the Eyes of this People. Our Company with one voice thanked me for my good Admonition, and promised me to liue soberly and ciuilly, and without giuing any the least occasion of Offence. So we spent our three dayes ioyfully, and without care, in expectation what would be done with vs, when they were expired. During which time, we had euery houre ioy of the Amendment of our Sick; who thought themselues cast into some Diuine Poole of Healing; They mended so kindly, and so fast.

The Morrow after our three dayes were past, ther came to vs a new Man, that we had not seen before, clothed in Blew as the former was, saue that his Turban was white, with a small red Crosse on the Topp. He had also a Tippet of fine Linnen. At his Comming in, he did bend to vs a

little, and put his Armes abroad. Wee of our parts saluted him in a very lowly and submissiue manner; As looking that from him, wee should receyue Sentence of Life, or Death. He desired to speak with some few of vs: Whereupon sixe of vs onely staied, and the rest auoyded the Roome. He said; I am by Office Gouverner of this House of Strangers, and by Vocation I am a Christian Priest; And therefore am come to you, to offer you my seruice, both as Strangers, and chiefly as Christians. Some things I may tell you, which I thinke you will not be unwilling to heare. The State hath giuen you Licence to stay on Land, for the space of sixe weekes: And let it not trouble you, if your occasions aske further time, for the Law in this point is not precise; And I doe not doubt, but my selfe shall be able, to obtaine for you, such further time, as may be conuenient. Yee shall also understand, that the Strangers House, is at this time Rich, and much aforehand; For it hath layd vp Reuenue these 37. yeares: For so long it is, since any Stranger arrived in this part: And therefore take yee no care; The State will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize yee haue brought, yee shall be well vsed, and haue your returne, either in Merchandize, or in Gold and Siluer: For to vs it is all one. And if you haue any other Request to make, hide it not. For yee shall finde, we will not make your Countenance to fall, by the Answer ye shall receiue. Onely this I must tell you, that none of you must goe aboue a Karan, (that is with them a Mile and an halfe) from the walles of the Citty, without especiall leaue. We answered, after we had looked awhile one vpon another, admiring this gracious and parent-like vsage; That we could not tell what to say: For wee wanted words to expresse our Thanks; And his Noble free Offers left vs nothing to aske. It seemed to vs, that we had before vs a picture of our Salvation in Heauen: For wee that were a while since in the Lawes of Death, were now brought into a place, where we found nothing but Consolations. For the Commandement laid vpon vs, we would not faile to obey it, though it was impossible, but our Hearts should be enflamed to tread further vpon this Happy and Holy Ground.

Wee

Wee added; *That our Tongues should first cleane to the Roofes of our Mouthes, ere we should forget, either his Reuerend Person, or this whole Nation, in our Prayers.* Wee also most humbly besought him, to accept of vs as his true seruants, by as iust a Right, as euer Men on Earth were bounden; laying and presenting, both our Persons, and all we had, at his feete. He said; *He was a Priest, and looked for a Priests reward; which was our Brotherly loue, and the Good of our Soules and Bodies.* So he went from vs, not without teares of Tendernesse in his Eyes; And left vs also confused with Ioy and Kindnesse, saying amongst our selues; *That wee were come into a Land of Angels, which did appeare to vs dayly, and praeuent vs with Comforts, which we thought not of, much lesse expected.*

The next day about 10. of the Clocke, the Gouvernour came to vs againe, and after Salutations, said familiarly; *That he was come to visit vs;* And called for a Chaire, and satt him downe; And we being some 10. of vs, (the rest were of the meaner Sort; or else gone abroad;) sate down with him. And when we were sett, he began thus. *Wee of this Island of Bensalem (for so they call it in their Language) haue this; That by meanes of our solitary Situation, and of the Lawes of Secrecy, which we haue for our Trauellers; and our rare Admission of Strangers; we know well most part of the Habitable World, and are our selues unknowne. Therefore because he that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that yee aske mee Questions, then that I aske you* We answered; *That wee humbly thanked him, that he would giue vs leave so to doe: And that wee conceined by the tast wee had already, that ther was no wordly thing on Earth, more worthy to be knowne, then the State of that happy Land. But about all (wee said) since that wee were mett from the seuerall Ends of the World; and hoped assuredly, that we should meete one day in the Kingdome of Heauen (for that we were both parts Christians) wee desired to know (in respect that Land was so remote, and so diuided by vast and unknowne Seas, from the Land, wher our SAVIOUR walked on Earth)*

Who was the Apostle of that Nation, and how it was conuerted to the Faith? It appeared in his face, that he tooke great Contentment in this our Question: Hee said; Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you First seeke the Kingdome of Heauen; And I shall gladly, and briefly, satisfie your demaund.

About twenty Yeares after the Ascension of our SAVIOUR, it came to passe, that ther was seen by the People of Renfusa, (a City vpon the Easterne Coast of our Island,) within Night, (the Night was Cloudy, and Calme,) as it might be some mile into the Sea, a great Pillar of Light; Not sharp, but in forme of a Columne, or Cylinder, rising from the Sea, a great way up towards Heauen; and on the topp of it was seene a large Crosse of Light, more bright and resplendent then the Body of the Pillar. Vpon which so strange a Spectacle, the People of the City gathered apace together vpon the Sands, to wonder; And so after put themselues into a number of small Boates, to goe nearer to this Marueilous sight. But when the Boates were come within (about) 60. yeards of the Pillar, they found themselues all bound, and could goe no further; yet so as they might moue to goe about, but might not approach nearer: So as the Boates stood all as in a Theater, beholding this Light, as an Heauenly Signe. It so fell out, that ther was in one of the Boates, one of our Wise Men, of the Society of Salomons House; which House, or Colledge (my good Brethren) is the very Eye of this Kingdome; Who hauing a while attentiuely and deuoutly viewed, and contemplated this Pillar, and Crosse, fell downe vpon his face; And then raysed himselfe vpon his knees, and lifting vp his Hands to Heauen, made his prayers in this manner.

LOrd God of Heauen and Earth; thou hast vouchsafed of thy Grace, to those of our Order, to know thy Workes of Creation, and the Secretts of them; And to discerne (as farre as appertaineth to the Generations of Men) Between Diuine Miracles,

acles, Workes of Nature, Works of Art, and Impostures and Illusions of all sorts. I doe here acknowledge and testifie before this People, that the Thing which we now see before our eyes, is thy Finger, and a true Miracle. And for-as-much, as we learne in our Bookes, that thou neuer workest Miracles, but to a Divine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but upon great cause) wee most humbly beseech thee, to prosper this great Signe; And to giue vs the Interpretation and vse of it in Mercy; Which thou dost in some part secretly promise, by sending it vnto vs.

When he had made his Prayer, hee presently found the Boate he was in, moueable and vnbound; whereas all the rest remained still fast; And taking that for an assurance of Leauē to approach, he caused the Boate to be softly, and with silence, rowed towards the Pillar. But ere he came neere it, the Pillar and Crosse of Light brake up, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seen, but a small Arke, or Chest of Cedar, dry, and not wet at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise Man had taken it, with all reuerence, into his Boate, it opened of it selfe, and there were found in it, a Booke, and a Letter; Both written in fine Parchment, and wrapped in Sindons of Linnen. The Booke contained all the Canonickall Bookes of the Old and New Testament, according as you haue them; (For we know well what the Churches with you receiue;) And the Apocalypse it selfe; And some other Bookes of the New Testament, which were not at that time written, were neuerthelesse in the Booke. And for the Letter, it was in these words.

I Bartholomew

I Bartholomew, a Seruant of the Highest, and Apostle of I E S V S C H R I S T, was warned by an Angell, that appeared to me, in a vision of Glory, that I should commit this Arke to the flouds of the Sea. Therefore, I doe testifie and declare, vnto that People, where G O D shall ordaine this Ark to come to Land, that in the same day, is come vnto them Saluation and Peace, and Good Will, from the Father, and from the L O R D I E S V S.

There was also in both these writings, as well the Booke, as the Letter, wrought a great Miracle, Conforme to that of the Apostles, in the Originall Gift of Tongues. For there being at that time, in this Land, Hebrewes, Persians, and Indians, besides the Natives, euery one redd vpon the Booke, and Letter, as if they had been written in his owne Language. And thus was this Land saued from Infidelity, (as the Remaine of the Old World was from Water) by an Ark, through the Apostolicall and Miraculous Euangelisme of Saint Bartholomew. And here hee paused, and a Messenger came, and called him from vs. So this was all that passed in that Conference.

The next Day, the same Gouvernour came againe to vs, immediately after Dinner, and excused himselfe, saying; That the Day before, he was called from vs, somewhat abruptly, but now he would make vs amends, and spend time with vs; if we held his Company, and Conference agreeable. Wee answered; That wee held it so agreeable and pleasing to vs, as wee forgot both Dangers past, and Feares to come, for the time wee heard him speake; And that wee thought, an Houre spent with him, was worth Yeares of our former life. He bowed himselfe a little to vs, and after we were set againe, he said; Well, the Questions are on your part. One of our Number said, after a little Pause; That there was a Matter, wee were no lesse desirous to know, then fearefull to aske, least wee might presume too farre.

But

But encouraged by his rare Humanity towards vs, (that could scarce thinke our selues Strangers, being his vowed and professed Seruants,) we would take the Hardines to propound it : Humbly beseeching him, if hee thought it not fit to bee answered, that hee would pardon it, though he reiectet it. Wee said; Wee well obserued those his words, which hee formerly spake, that this happy Island, wher we now stood, was knowne to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of Europe, and knew much of our State and Businesse; And yet we in Europe, (notwithstanding all the remote Discoveries, and Navigations of this last Age) neuer heard any of the least Inking or Glimse of this Island. This we found wonderfull strange; For that all Nations haue Enterknowledge one of another, either by Voyage into Forraigne Parts, or by Strangers that come to them: And though the Trauailer into a Forreine Countrey, doth commonly know more by the Eye, then he that stayeth at home can by relation of the Trauailer; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee neuer heard tell of any Shipp of theirs, that had been seene to arriue vpon any shore of Europe; No, nor of either the East or West Indies, nor yet of any Shipp of any other part of the World, that had made returne from them. And yet the Maruell rested not in this; For the Situation of it (as his Lordship said,) in the secret Conclaue of such a vast Sea mought cause it. But then, that they should haue Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to vs a condition and Proprietie of Diuine Powers and Beings, to be hidden and vnseene to others, and yet to haue others open, and as in a light to them. At this speech the Gouvernour gaue a gracious smile, and sayd; That we did well to aske pardon for this Question we now asked; For that it imported, as if we thought this Land, a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes and Intelligence of other Countries. It was answered by vs all, in all possible humblenes, but yet with a Countenance taking knowledge, that

we knew he spake it but merrily; That we were apt enough to think, ther was somewhat supernaturall in this Island; but yet rather as Angelicall, then Magicall. But to let his Lordship know truely, what it was, that made vs tender and doubtful to aske this Question, it was not any such conceit, but because we remembred, he had giuen a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers. To this he said; You remember it aright: And therefore in that I shall say to you, I must reserue some particulars, which it is not lawfull for mee to reueale; but there will bee enough left, to giue you satisfaction.

You shall vnderstand (that which perhaps you will scarce think credible) that about three thousand Yeares agoe, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater then at this Day. Doe not thinke with your selues, that I know not how much it is encreased with you, within these sixescore Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, that saued the Remnant of Men, from the vniuersall Deluge, gaue Men confidence to aduenture vpon the Waters; Or what it was; but such is the Truth. The Phoeniceans, and specially the Tyrians, had great Fleeter. So had the Carthaginians their Colony, which is yet further West. Toward the East the Shipping of Egypt, and of Palestina was likewise great. China also, and the great Atlantis, (that you call Americ) which haue now but Iunks, and Canoas, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fiftene hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But we haue large Knowledge thereof.

At that time, this Land was knowne and frequented by the Shippes and Vessells of all the Nations before named. And (as it cometh to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; So as almost all Nations of Might and Fame resorted hither; Of whom we haue some Stirps, and little Tribes with vs, at this day. And for our owne Ships, they went sundry Voyages; as well to your Streights, which you call the Pillars of Hercules, As to other parts in the Atlantique

Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambaline) and Quinzy, upon the Orientall Seas, as farre as to the Borders of the East Tartary

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description, which is made by a great Man with you; that the Descendents of Neptune planted there; and of the Magnificent Temple, Pallace, Citie, and Hill; And the manifold streames of goody Navigable Riwers, (which as so many Chaines enuironed the same Site, and Temple;) And the seuerall Degrees of Ascent, wherby Men did climb vp to the same, as if it had bin a Scala Cæli, be all Poetical & Fabulous: Yet so much is true, that the said Country of Atlantis; As well that of Peru then called Coya, as that of Mexico then named Tyrambel, were mighty & proud Kingdomes, in Armes, Shipping, and Riches: So Mighty, as at one time, (or at least within the space of 10. Yeares,) they both made two great Expeditions; They of Tirambel through the Atlantique to the Mediterrane Sea; and they of Coya through the South Sea upon this our Island: And for the former of these, which was into Europe, the same Anchor amongst you, (as it seemeth,) had some relation from the Egyptian Priest, whom he citeth. For assuredly such a thing ther was. But whether it were the Ancient Athenians, that had the glory of the Repulse, and Resistance of those Forces, I can say nothing: But certaine it is, there neuer came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of those of Coya upon vs, had better fortune, if they had not met with Enemies of greater clemency. For the King of this Island, (by name Altabin,) a wise Man, and a great Warriier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as he cut off their Land-Forces, from their Ships; and entoyled both their Nauy, and their Campe, with a greater Power then theirs, both by Sea and Land: And compelled them to render themselues without striking stroke: And after they were at his Mercy, contenting himselfe onely with their Oath, that they should no more beare Armes against him, dismised them all in safety. But the Diuine Reuenge ouertooke not long after those proud Enterprises. For within lesse then the space of one Hundred

Yeares, the Great Atlantis was utterly lost and destroyed: Not by a great Earthquake, as your Man saith; (For that whole Tract is little subiect to Earthquakes;) But by a particular Deluge or Inundation; Those Countries hauing, at this Day, farr greater Ri- uers, and farr higher Mountaines, to poure downe waters, then a- ny part of the Old World. But it is true, that the same Inundation was not deepe; Not past fourty foote, in most places, from the Ground; So that, although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were sau'd by flying to the high Trees and Woods. For as for Men, al- though they had Buildings in many places, higher then the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; wherby they of the Vale, that were not drown- ed, perished for want of Food, and other things necessary. So as maruaile you not at the thin Population of America, nor at the Rudenesse and Ignorance of the People; For you must ac- count your Inhabitants of America as a young People; Younger a thousand yeares, at the least, then the rest of the World: For that ther was so much time, betweene the Vniuersall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey againe slowly, by little and little; And being simple and sauage People, (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leaue Letters, Arts, and Ciuility, to their Posterity; And hauing likewise in their Mountainous Habitations beene used, (in respect of the Extreame Cold of those Regions,) to cloath themselves with the Skins of Tygers, Beares, and great Hai- ry Goates, that they haue in those Parts; When after they came downe into the Valley, and found the Intollerable Heates which are there, and knew no meanes of lighter Apparell; they were forced to beginn the Custome of Going Naked, which con- tinueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this also they tooke from those their Auicestours of the Mountaines, who were invited vnto it, by the infinite Flights of Birdes, that came vp to the high Grounds, while the Waters flood below. So you see, by this maine Acci- dent

lent of Time, wee lost our Traffique with the Americans, with whom, of all others, in regard they lay nearest to vs, wee had most Commerce. As for the other Parts of the World, it is most manifest, that in the Ages following, (whether it were in respect of Warres, or by a naturall Revolution of Time,) Navigation did every where greatly decay; And specially, farre to ages, (the rather by the use of Gallies, and such Vessells as could hardly brooke the Ocean,) were altogether left and omitted. So then, that part of Entercourse, which could bee from other Nations, to Sayle to vs, you see how it hath long since ceased; Except it were by some rare Accident, as this of yours. But now of the Cessation of that other Part of Entercourse, which mought be by our Sayling to other Nations, I must yeeld you some other Cause. For I cannot say, (if I shall say truly,) but our Shipping, for Number, Strength, Marriners, Pylots, and all things that appertaine to Navigation, is as great as euer; And therefore why we should sit at home, I shall now giue you an account by it selfe; And it will draw nearer, to giue you satisfaction, to your principall Question.

There raigned in this Island, about 1900. yeares agoe, a King, whose memory of all others we most adore; Not Superstitiously, but as a Divine Instrument, though a Mortall Man: His Name was Solamona: And we esteeme him as the Law-giuer of our Nation. This King had a large heart, inscrutable for good; And was wholly bent to make his Kingdome and People Happy. He therefore taking into Consideration, how sufficient and substantiue this Land was, to maintaine it self, without any ayd (at all) of the Forrainger; Being 5600. Miles in circuit, and of rare Fertility of Soyle, in the greatest part thereof; And finding also the Shipping of this Country mought bee plentifully set on worke, both by Fishing, and by Transportations from Port to Port, and likewise by Sayling vnto some small Islands that are not farre from vs, and are vnder the Crowne and Lawes of this State; And recalling into his Memory, the happy and flourishing Estate, wherein this Land then was; So as it mought bee a thousand wayes altered to the worse, but scarce any one way to the better; thought nothing

wanted to his Noble and Heroicall Intentions, but onely (as farr as Humane foresight mought reach) to giue perpetuities to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine the Interdicts and Prohibitions, which wee haue touching Entrance of Strangers; which at that time (though it was after the Calamity of America) was frequent; Doubting Nouelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an Ancient Law, in the Kingdome of China, and yet continued in vse. But ther it is a poore Thing; And hath made them a curious, ignorant, fearesfull, foolish Nation. But our Law-giuer made his Law of another temper. For first, hee hath preserved all points of Humanity, in taking Order, and making Provision for the Reliefe of Strangers distressed; whereof you haue tasted. At which Speech (as reason was) wee all rose vp, and bowed our selues. Hee went on. That King also still desiring to ioyne Humanity and Pollicy together; And thinking it against Humanity, to detain Strangers here against their wills; And against Pollicy, that they should returne, and discouer their Knowledge of this Estate, he tooke this Course: He did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as would; But as many as would stay, should haue very good Conditions, and Meanes to liue, from the State. Wherein hee saw so farre, that now in so many Ages since the Prohibition, wee haue memory not of one Shipp that euer returned, and but of thirteene Persons onely, at severall times, that chose to returne in our Bottoomes. What those few that returned may haue reported abroad I know not. But you must thinke, Whatsoever they haue said, could bee taken where they came, but for a Dreame. Now for our Travelling from hence into Parts abroad, our Law-giuer thought fit altogether to restraine it. So is it not in China. For the Chineses sayle where they will, or can; which sheweth, that thier Law of Keeping out Strangers, is a Law of Pusillanimity, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preseruing the good which cometh

with by communicating with Strangers, and avoiding the Hurt;
 And I will now open it to you. And here I shall seeme a little to
 digresse, but you will by and by finde it pertinent. Yee shall un-
 derstand, (my deare Friends,) that amongst the Excellent Acts
 of that King, one above all hath the preheminnce. It was the Ere-
 ction, and Institution of an Order, or Society, which wee call Sa-
 lomons House; The Noblest Foundation, (as wee thinke,) that
 ever was upon the Earth; And the Lanthorne of this Kingdome.
 It is dedicated to the Study of the Works, and Creatures of GOD.
 Some thinke it beareth the Founders Name a little corrupted, as
 if it should be Solamona's Houle. But the Records write it, as it
 is spoken. So as I take it to bee denominated of the King of the He-
 brewes, which is famous with you, and no Stranger to vs.
 For wee have some Parts of his Works, which with you are lost;
 Namely that Naturall History, which hee wrote of all Plants,
 from the Cedar of Libanus, to the Mousse that groweth out
 of the Wall; And of all things that haue Life and Motion.
 This maketh me thinke, that our King finding himselfe to Sym-
 bolize, in many things, with that King of the Hebrewes (which
 lived many yeares before him) honoured him with the Title of
 this Foundation. And I am the rather induced to be of this Opi-
 nion, for that I finde in ancient Records, this Order or Societie
 is sometimes called Salomons Houle; And sometimes the
 Collidge of the sixe Daies Workes: wherby I am satisfi-
 ed, That our Excellent King had learned from the Hebrewes,
 That GOD had created the World, and all that therein is, within
 sixe Dayes; And therefore hee instituting that Houle, for the
 finding out of the true Nature of all Things, (wherby GOD
 might haue the more Glory in the Workmanship of them, and
 Men the more fruit in the vse of them,) did giue it also that
 second Name. But now to come to our present purpose. When
 the King had forbidden, to all his People, Navigation into a-
 ny Part, that was not vnder his Crowne, he made neuerthelesse
 this Ordinance; That euery twelue yeares ther should be set forth,
 out of this Kingdome, two Ships, appointed to seuerall Voya-
 ges; That in either of these Shippes, ther should be a Mission of
 three of the Fellowes, or Brethren of Salomons Houle;
 whose

whose Errand was onely to giue vs Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inuentions of all the World; And withall to bring vnto vs, Bookes, Instruments, and Patternes, in euery kinde: That the Ships, after they had landed the Brethren, should returne; And that the Brethren should stay abroad till the new Mission. These Ships are not otherwise fraught, then with Store of Victualls, and good Quantitie of Treasure to remaine with the Brethren, for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the Vulgar sort of Marriners are contained from being discovered at Land; And how they that must be put on shore for any time, colour themselves vnder the Names of other Nations; And to what places these Voyages haue beene designed; And what places of Rendez-Vous are appointed for the new Missions; And the like Circumstances of the Practique; I may not doe it; Neither is it much to your desire. But thus you see, wee maintaine a Trade, not for Gold, Siluer, or Jewels; Nor for Silkes; Nor for Spices; Nor any other Commodity of Matter; But onely for Gods first Creature, which was Light: To haue Light (I say) of the Growth of all Parts of the World. And when hee had said this, he was silent; And so were wee all. For indeed wee were all astonished, to heare so strange things, so probably told. And hee perceiuing, that wee were willing to say somewhat, but had it not ready, in great Courtesie tooke vs off, and descended to aske vs Questions of our Voyage and Fortunes, and in the end concluded, that we mought doe well, to thinke with our selues, what Time of stay wee would demand of the State; And bad vs not to scant our selues; For he would procure such time as wee desired. Wherevpon wee all rose vp, and presented our selues to kisse the skirt of his Tippet; But hee would not suffer vs; and so tooke his leaue. But when it came once amongst our People, that the State vsed to offer Conditions to Strangers, that would stay, wee had Worke enough to get any of our Men to looke to our Shipp; And

to keepe them from going presently to the Gouvernour, to craue Conditions. But with much adoe wee refrained them, till we mought agree what Course to take.

We took our selues now for free men, seeing ther was no danger of our vtter Perdition; And liued mo^t ioyfully, going abroad, and seeing what was to be seen, in the Citty, and places adincent, within our *Tedder*; And obtaining Acquaintance with many of the Citty, not of the meanest Quallity; At whose hands we found such Humanity, and such a Freedome and desire, to take Strangers, as it were, into their Bosome, as was enough to make vs forget all that was deare to vs, in our owne Countries: And continually we mett with many things, right worthy of Obseruation, & Relation: As indeed, if ther be a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, & Reuerend Custome it is, shewing that Nation to be compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall liue to see thirty Persons, descended of his Body, aliue together, and all about 2. yeares old, to make this *Feast*, which is done at the Cost of the State. The *Father* of the *Family*, whom they call the *Tirfan*, two dayes before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Gouvernour of the Citty, or Place, where the *Feast* is celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirfan* sitteth in Consultation, cōcerning the good Estate of the *Family*. Ther, if ther be any Discord or sutes betweene any of the *Family*, they are compounded and appealed. Ther, if any of the *Family* bee Distressed or Decayed, order is taken for their Reliefe, and competent meanes to liue. Ther, if any bee subiect to vice, or take ill Courses, they are reprobued and Censured. So likewise, Direction is giuen touching Marriages, and the Courses of life, which any of them should take, with diuers other the like Orders and Aduises. The Gouvernour assisteth, to the end, to put in Execution, by his

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Publicke Authority, the Decrees and Orders of the *Tirfan*, if they should bee disobeyed ; Though that seldome needeth ; Such Reuerence and Obedience they giue, to the Order of Nature. The *Tirfan* doth also then, euer chuse one Man from amongst his Sonnes, to liue in House with him ; Who is called, euer after, the *Sonne of the Vine*. The Reason will hereafter appeare. On the *Feast* day, the *Father* or *Tirfan* commeth forth after Diuine Seruice, into a large Roome, where the *Feast* is celebrated ; Which Roome hath an Halfe-Pace at the vpper end. Against the wall, in the middle of the halfe-pace, is a Chaire placed for him, with a Table and Carpet before it. Ouer the Chaire is a State, made Round or Ouall, and it is of Iuy ; An Iuy somewhat whiter then ours, like the Lease of a Siluer Aspe, but more shining ; For it is Greene all Winter. And the State is curiously wrought with Siluer and Silke of diuers Colours, broyding or binding in the Iuy ; And is euer of the worke, of some of the Daughters of the Family ; And vailed ouer at the Topp, with a fine Nett of Silke and Siluer. But the Substance of it, is true Iuy ; wherof, after it is taken downe, the Friends of the Family, are desirous to haue some Lease or Sprigg to keepe. The *Tirfan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him ; And if there be a Mother, from whose Body the whole Linage is descended, there is a Trauerse placed in a Loft aboue, on the right hand of the Chaire, with a priuy Dore, and a carued Window of Glasse, leaded with Gold and blew ; Wher shee sitteth, but is not seene. When the *Tirfan* is come forth, he sitteth downe in the Chaire ; And all the Linage place themselues against the wall, both at his back, and vpon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sexe, and stand vpon their Feete. When hee is sett, the Roome being alwaies full of Company, but well kept and without Disorder, after some pause, there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald* ;) And

And on either side of him two *young Lads* ; Wherof one carrieth a Scrowle of their shining yellow Parchment ; And the other a Cluster of Grapes of Gold, with a long Foote or Stalke. The *Herald*, and *Children*, are cloathed with Mantles of Sea-water greene Sattin ; But the *Heralds* Mantle is streamed with Gold, and hath a Traine. Then the *Herald* with three Curtesies, or rather Inclinations, commeth vp as farre as the Halfe-pace ; And ther first taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Guift of Reuenew, and many Priuiledges, Exemptions, and Points of Honour, granted to the *Father* of the *Family* ; And it is euer stiled and directed ; *To such an one, Our welbeloued Friend and Creditour* : Which is a Title proper onely to this Case. For they say, the King is Debter to no Man, but for Propagation of his Subiects, The Scale set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold ; And though such *Charters* bee expedited of Course, and as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud ; And while it is read, the *Father* or *Tirfan*, standeth vp, supported by two of his Sonnes, such as lye chooleth. Then th: *Herald* mounteth the Halfe-Pace, and deliuereth the *Charter* into his Hand ; And with that there is an Acclamation, by all that are present, in their Language, which is thus much ; *Happy are the people of Bensalem*. Then the *Herald* taketh into his Hand from the other Child, the Cluster of Grapes, which is of Gold ; Both the Stalke, and the Grapes. But the Grapes are daintely enamelled ; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne sett on the Topp ; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Topp. The Grapes are in number as many as there are Descendents of the *Family*. This Golden Cluster, the *Herald* deliuereth also to the *Tirfan* ; Who presently deliuereth it ouer, to that Sonne, that hee had formerly

merly chosen, to bee in House with him ; Who beareth it before his *Father*, as an Ensigne of Honour, when he goeth in publicke euer after ; And is thereupon called *the Sonne of the Vine*. After this Ceremony ended, the *Father* or *Tirfan* retireth ; And after some time commeth forth againe to Dinner, where he sitteth alone vnder the State, as before ; And none of his Descendants sit with him, of what Degree or Dignitie soeuer, except he hap to be of *Salomons House*. Hee is serued onely by his owne Children, such as are Male ; who performe vnto him all seruice of the Table vpon the knee ; And the Women onely stand about him, leaning against the wall. The Roome belowe the Halfe-pace, hath Tables on the sides for the Ghests that are bidden ; Who are serued with great and comely order ; And towards the end of Dinner (which in the greatest Feasts with them, lasteth neuer aboute an Houre and an halfe) there is an *Hymne* sung, varied according to the Inuention of him that composeth it ; (for they haue excellent Poesie ;) But the Subiect of it is, (alwayes,) the prayses of *Adam*, and *Noah*, and *Abraham* ; Wherof the former two Peopled the World, and the last was the *Father* of the Faithfull : Concluding euer with a Thankesgiuing for the Natiuitie of our *Sauour*, in whose Birth, the Births of all are onely Blessed. Dinner being done, the *Tirfan* retireth againe ; And hauing withdrawne himselfe alone into a place ; where hee maketh some priuate Prayers, hee commeth forth the third time, to giue the Blessing ; with all his Descendants, who stand about him, as at the first. Then he calleth them forth by one and by one, by name, as he pleaseth, though seldome the Order of Age bee inuerted. The person that is called, (the Table being before remoued,) kneeleth downe before the Chaire, and the *Father* layeth his Hand, vpon his Head, or her Head, and giueth the Blessing in these Wordes ; *Sonne of Bensalem, (or Daughter of Bensalem,) thy Father saith it ; The Man by whom thou hast Breath and Life speaketh the word ; The Blessing of the Euerlasting Father,*
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the Prince of Peace, and the Holy Dove, bee upon thee, and make the dayes of thy Pilgrimage, good, and many. This he saith to euery of them; And that done, if there be any of his Sonnes, of eminent Meritt and Vertue, (so they be not aboute two,) hee calleth for them againe; And saith, laying his Arme ouer their Shoulders, they standing; Sonnes, it is well yee are borne, giue God the prayse, and perseuere to the end. And withall deliuereth to either of them a lewel, made in the Figure of an Eare of Wheat, which they euer after weare in the front of their Turban, or Hat. This done, they fall to Mulick and dances, And other Recreations, after their manner, for the rest of the day. This is the full order of that Feast.

By that time, sixe or seuen Dayes were spent, I was fallen into straight Acquaintance, with a Merchant of that City, whose Name was Ioabin. Hee was a Jew and Circumcised: For they haue some few Stirps of Iewes, yet remaining amongst them, whom they leaue to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the Iewes in other Parts. For whereas they hate the Name of CHRIST; And haue a secret inbred Rancour against the People amongst whom they liue; These (contrariwise) giue vnto our SAVIOUR many high Attributes, and loue the Nation of Bensalem, extremely. Surely this Man, of whom I speake, would euer acknowledge, that CHRIST was borne of a Virgin; And that hee was more then a Man; And hee would tell how GOD made him Ruler of the Seraphims, which guard his Throane; And they call him also the Milken Way, and the Eliah of the Messiah; And many other High Names; which though they be inferiour to his Diuine Maiestie, Yet they are farre from the Language of other Iewes. And for the Countrey of Bensalem, this Man would make no end of commending it; Being desirous by Tradition amongst the Iewes there, to haue it beleueed, that the People thereof were of the Generations of Abraham, by another Sonne, whom they call Nachoran; And

that *Moses* by a secret *Cabala* ordained the Lawes of *Bensalem* which they now vse ; And that when the *Messiah* should come, and sit in his Throne at *Hierusalem*, the King of *Bensalem*, should sit at his feet, whereas other Kings should keepe a great distance. But yet setting aside these *Iewish* Dreames, the Man was a wise Man, and learned, and of great Policy, and excellently seene in the Lawes and Customes of that Nation. Amongst other Discourses, one day, I told him, I was much affected with the Relation I had, from some of the Company, of their Custome, in holding the *Feast of the Family* ; For that (me thought) I had neuer heard of a Solemnity, wherein Nature did so much preside. And becaule Propagation of Families, proceedeth from the Nuptiall Copulation, I desired to know of him, what Lawes and Customes they had concerning Marriage ; And whether they kept Marriage well ; And whether they were tyed to one Wife ; For that wher Population is so much affected, and such as with them it seemed to be, ther is commonly Permission of *Plurality of Wives*. To this he said ; You haue Reason for to commend that excellent Institution of the *Feast of the Family*. And indeed wee haue Experience, that those Families, that are partakers of the Blessing of that *Feast*, doe flourish and prosper euer after, in an extraordinary manner. But heare mee now, and I will tell you what I know. You shall vnderstand, that there is not vnder the Heauens, so chaste a Nation, as this of *Bensalem* ; Nor so free from all Pollution, or foulness. It is the *Virgin of the World*. I remember, I haue read in one of your *European* Booke, of an holy Hermit amongst you, that desired to see the Spirit of Fornication, and there appeared to him, a little foule vgly *Aethiope*. But if he had desired to see the Spirit of Chastitie of *Bensalem*, it would haue appeared to him, in the likeness of a faire beautifull Cherubin. For there is nothing, amongst Mortall Men, more faire and admirable, then the Chast Mindes of this People. Know therefore, that with them ther are no Stewes, no dissolute Houses, no Curtisans, nor any thing of that kind. Nay they wonder (with detestation) at you in Europe, which

permit

permit such things. They say ye haue put Marriage out of office:
 For Marriage is ordained a Remedy for unlawfull Concupiscence;
 And Naturall Concupiscence seemeth as a spurr to Marriage. But
 when Men haue at hand a Remedy, more agreeable to their cor-
 rupt will, Marriage is almost expulsed. And therefore ther are
 with you seene infinite Men, that marry not, but chuse rather a
 libertine and impure single Life, then to be yoked in Marriage;
 And many that doe marry, marry late, when the Prime and
 Strength of their Yeares is past. And when they doe marry, what
 is Marriage to them, but a very Bargaine; Wherin is sought
 Alliance, or Portion, or Reputation, with some desire (almost in-
 different) of Issue; And not the faithfull Nuptiall Vnion of Man
 and Wife, that was first instituted. Neither is it possible, that
 those that haue cast away so basely, so much of their Strength,
 should greatly esteeme Children, (being of the same Matter,) as
 Chast Men doe. So Likewise during Marriage is the Case much
 amended, as it ought to bee if those things were tolerated onely
 for necessitie? No, but they remaine still as a very Affront to
 Marriage. The Haunting of those dissolute places, or resort to
 Curtizans, are no more punished in Married Men, then in Bat-
 chellers. And the depraued Custome of change, and the Delight in
 Meretricious Embracements, (wher sinne is turned into Art,) maketh
 Marriage a dull thing, and a kinde of Imposition, or Taxe.
 They heare you defend these things, as done to auoyd greater Euills;
 As Aduenturies, Deflowering of Virgins, Vnnaturall lust, and the
 like. But they say, this is a preposterous Wisdome; And they call it
 Lot's offer, who to saue his Guests from abusing, Offered his
 Daughters: Nay they say further, That ther is little gained in this;
 For that the same Vices and Appetites, doe still remayne and a-
 bound; Vnlawfull Lust being like a Furnace, that if you stopp
 the Flames altogether, it will quench; But if you giue it
 any vent, it will rage. As for Masculine Loue, they haue no
 touch of it; And yet ther are not, so faithfull and inuiolate Freind-
 ships, in the world againe, as are ther: And to speake gene-
 rally, (as I said before,) I haue not read of any such Chastity,
 in any People, as theirs: And their vsuall saying is, That who-
 focuer is ynchast cannot reuerence himselve: And they say;
 That

That the Reuerence of a Mans selfe, is, next Religion, the chiefeſt Bridle of all Vices. And when hee had ſaid this, the good Jew pauſed a little; Whereupon, I farr more willing to heare him ſpeake on, then to ſpeake my ſelfe; yet thinking it decent, that vpon his pauſe of Speech, I ſhould not be altogether ſilent, ſaid onely this; *That I would ſay to him, as the Widow of Sarepta ſaid to Elias; that he was come to bring to Memory our Sinnes; And that I confeſſe the Righteouſneſſe of Bentalern, was greater then the Righteouſneſſe of Europe.* At which ſpeech hee bowed his Head, and went on in this manner. *They haue alſo many wiſe and excellent Lawes touching Marriage. They allow no Polygamy. They haue ordained that none doe intermarry or contract, untill a Moneth be paſt from their firſt Inter-viue. Marriage without conſent of Parents they doe not make void, but they mulct it in the Inheritor: For the Children of ſuch Marriages, are not admitted to inherit, aboue a third Part of their Parents Inheritance. I haue read in a Booke of one of your Men, of a Faigned Common-wealth, wher the Married Couple are permitted, before they Contract, to ſee one another Naked. This they diſlike: For they thinke it a Scorne, to giue a Refuſall after ſo Familiar Knowledge: But becauſe of many hidden Defects in Men and Womens Bodies, they haue a more ciuill Way: For they haue neare euery Towne, a Couple of Pooles, (which they call Adams and Eues Pooles,) wher it is permitted to one of the Friends of the Man, and another of the friends of the Woman, to ſee them ſeuerally both Naked.*

And as wee were thus in Conference, ther came one that ſeemed to be a Meſſenger, in a rich Huke, that ſpake with the Jew: Whereupon hee turned to mee, and ſaid; *You will pardon mee, for I am commanded away in haſt. The next Morning he came to me againe, ioyfull as it ſeemed, and ſaid; There is word come to the Gouvernour of the City, that one of the Fathers of Salomons Houſe, will be here this day Seuen-night: Wee haue ſeene none of them this Dozen Yeares. His Comming is in State; But the Cauſe of his com-
ming is ſecret. I will provide you, and your Fellowes, of a good*
Standing

Standing, to see his Entry. I thanked him, and told him; I was most glad of the Newes. The Day being come he made his Entry. He was a Man of middle Stature, and Age, comely of Person, and had an Aspect as if he pittied Men. He was cloathed in a Roabe of fine black Cloath, with wide Sleeues, and a Cape. His vnder Garment was of excellent white Linnen, downe to the Foote, girt with a Girdle of the same; And a Sindon or Tippet of the same about his Neck. He had Gloues, that were curious, and sett with Stone; And Shoes of Peach-coloured Veluet. His Neck was bare to the Shoulders. His Hatt was like a Helmett, or *Spanish Moutera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cutt round, and of the same colour with his Haire, somewhat lighter. He was carried in a rich Chariott, without Wheelles, Litter-wise; With two Horses at either end, richly trapped in blew Veluett Embroydered; and two Footmen on each side in the like Attire. The Chariott was all of Cedar, gilt, and adorned with CrySTALL; Saue that the Fore-end had Pannells of Sapphires, set in Borders of Gold; And the Hinder-end the like of Emerauds of the *Pern* Colour. Ther was also a Sunn of Gold, Radiant, vpon the Topp, in the Midst; And on the Topp before, a small *Cherub* of Gold, with Wings displayed. The Chariott was couered with Cloath of Gold tissued vpon Blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coates to the Mid Legg; And Stockins of white Silk; And Shoes of blew Veluet; And Hatts of blew Veluett; with fine Plumes of diuerse Colours, sett round like Hat-bands. Next before the Chariott, went two Men, bare headed, in Linnen Garments downe to the Foote, girt, and Shoes of blew Veluett; Who carried, the one a Crosier, the other a Pastorall Staffe like a Sheep-hooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men he had none, neither before, nor behinde his Chariott: As it seemeth to auoyd all Tumult and Trouble. Behinde

his Chariott, went all the Officers and Principalls of the Companies of the Citty. He sat alone, vpon Cushions, of a kinde of excellent Plush, blew; And vnder his Foote curious Carpetts of Silk of diuerse Colours, like the Persian, but farr finer. He held vp his bare Hand, as he went, as blessing the People, but in Silence. The Street was wonderfully well kept; So that ther was neuer any Army had their Men stand in better Battell-Array, then the People stood. The Windowes likewise were not crouded, but euery one stood in them, as if they had been placed. When the shew was past, the Jew said to me; *I shall not be able to attend you as I would, in regard of some charge the Citty hath lay'd vpon me, for the Entertaining of this Great Person.* Three dayes after the Jew came to me againe, and said; *Ye are happy Men; for the Father of Salomons House taketh knowledge of your Being here, and commanded me to tell you, that he will admitt all your Company to his presence, and haue priuate Conference with one of you, that ye shall choose: And for this hath appointed the next day after too Morrow. And because he meaneth to giue you his Blessing, he hath appointed it in the Forenoone.* We came at our Day, and Houre, and I was chosen by my Fellowes for the priuate Access. We found him in a faire Chamber, richly hanged, and carpetted vnder Foote, without any Degrees to the State. He was sett vpon a Low Throne richly adorned, and a rich Cloath of State ouer his Head, of blew Sattin Embroidered. He was alone, saue that he had two Pages of Honour, on either Hand one, finely attired in White. His Vnder Garments were the like that we saw him weare in the Chariott; but in stead of his Gowne, he had on him a Mantle with a Cape, of the same fine Black, fastned about him. When we came in, as we were taught, we bowed Lowe at our first Entrance; And when we were come neare his Chaire, he stood vp, holding forth his Hand vngloured, and in Posture of Blessing; And we euery one of vs stooped downe, and kissed the Hemme of his Tippet. That done, the rest departed, and I remayned.

Then

Then hee warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to me thus in the *Spanish Tongue*.

GOD blesse thee, my Sonne; I will giue thee the greatest Iewell I haue: For I will impart vnto thee, for the Loue of GOD and Men, a Relation of the true State of Salomons House. Sonne, to make you know the true state of Salomons House, I will keepe this order. First I will set forth vnto you the End of our Foundation. Secondly, the Preparations and Instruments we haue for our Workes. Thirdly, the severall Employments and Functions whereto our Fellowes are assigned. And fourthly, the Ordinances and Rites which we obserue.

The End of our Foundation is the Knowledge of Causes, and Secrett Motions of Things; And the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible.

The Preparations and Instruments are these. We haue large and deepe Caues of severall Depths: The deepest are sunke 600. Fathome: And some of them are digged and made vnder great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the Caue, they are (some of them) about three

Miles deepe. For wee finde, that the Depth of a Hill, and the Depth of a Caue from the Flat, is the same Thing; Both remote alike, from the Sunn and Heauens Beames, and from the Open Aire. These Caues we call the Lower Region; And wee vse them for all Coagulations, Indurations, Refrigerations, and Conservations of Bodies. We vse them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettalls, by Compositions and Materialls which we vse, and lay ther for many yeares. Wee vse them also sometimes, (which may seeme strange,) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to liue ther, well accommodated of all things necessarie, and indeed liue very long; By whom also we learne many things.

We haue Burialls in seuerall Earths, wher we put diuerse Cements, as the Chineses doe their Porcellane. But we haue them in greater Varietie, and some of them more fine. We haue also great variety of Composts, and Soiles, for the Making of the Earth Fruitfull.

We haue High Towers; The Highest about halfe a Mile in Heigth; And some of them likewise set vpon High Mountaines: So that the Vantage of the Hill with the Tower, is in the highest of them three Miles at least. And these Places wee call the Vpper Region; Accounting the Aire betweene the High Places, and the Lowe,

Lowe, as a Middle Region. Wee use these Towers, according to their severall Heights, and Situations, for Insolation, Refrigeration, Conservation; And for the View of diuers Meteors; As Windes, Raine, Snow, Haile; And some of the Fiery Meteors also. And upon them, in some Places, are Dwellings of Hermits, whom wee visit sometimes, and instruct what to observe.

We haue great Lakes, both Salt, and Fresh; wherof we haue use for the Fish, and Fowle. We use them also for Burialls of some Naturall Bodies: For we finde a Difference in Things buried in Earth, or in Aire below the Earth; and things buried in Water. We haue also Pooles, of which some doe straine Fresh Water out of Salt; And others by Art doe turne Fresh Water into Salt. We haue also some Rocks in the Midst of the Sea; And some Bayes vpon the Shore for some Works, wherein is required the Ayre and Vapour of the Sea. We haue likewise Violent Streames and Cataracts, which serue vs for many Motions: And likewise Engines for Multipling and Enforcing of Windes, to set also on going diuerse Motions.

We haue also a Number of Artificiall Wells, and Fountaines, made in Imitation of the Naturall Sources and Baths; As tinted vpon Vitrioll, Sulphur, Steele, Brasse, Lead, Nitre, and other Mineralls. And againe wee haue little

VVells for Infusions of many Things, wher the **V**Vaters take the Vertue quicker and better, then in Vessells, or Basins. And amongst them we haue a **V**Vater, which wee call **V**Vater of Paradise, being, by that we doe to it, made very Soueraigne for Health, and Prolongation of Life.

We haue also Great and Spacious Houses, wher we imitate and demonstrate Meteors; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of **V**Vater, Thunders, Lightnings; Also Generations of Bodies in Aire; As Froggs, Flies, and diuerse Others.

We haue also certaine Chambers, which wee call Chambers of Health; wher wee qualifie the Aire as we thinke good and proper for the Cure of diuerse Diseases, and Preseruatiō of Health.

Wee haue also faire and large Baths, of seuerall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: And Others for the Confirming of it in Strength of Sinnewes, Vitall Parts, and the very Iuyce and Substance of the Body.

We haue also large and various Orchards, and Gardens; Wherin we do not so much respect Beauty, as Variety of Ground and Soyle, proper for diuerse Trees, and Herbs: And some very spacious, wher Trees, and Berries are set, wherof we make diuerse Kinds of Drinks, besides the Vine-yards. In these wee practise likewise all Conclusions of Grafting, and Inoculating, as well of **V**Vilde-Trees,

as Fruit-Trees, which produceth many Effects. And we make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier, or later, then their Seasons ; And to come up and beare more speedily then by their Naturall Course they doe. We make them also by Art greater much then their Nature ; And their Fruit greater, and sweeter, and of differing Tast, Smell, Colour, and Figure, from their Nature. And many of them we so Order as they become of Medicinall Vse.

Wee haue also Meanes to make diuerse Plants, rise by Mixtures of Earths without Seedes ; And likewise to make diuerse New Plants, differing from the Vulgar ; and to make one Tree or Plant turne into another.

We haue also Parks, and Enclosures of all Sorts, of Beasts, and Birds ; which wee vse not onely for View or Rarenesse, but likewise for Dissections, and Trialls ; That therby we may take light, what may be wrought upon the Body of Man. Wherein we finde many strange Effects ; As Continuing Life in them, though diuerse Parts, which you account Vitall, be perished, and taken forth ; Resuscitating of some that seeme Dead in Appearance ; And the like. We try also all Poysons, and other Medicines upon them, as well of Chyrurgery, as Phisicke. By Art likewise, we make them Greater, or Taller, then their Kinde is ; And contrary-wise Dwarfed them and stay their Growth :

Wee

Wee make them more Fruitfull, and Bearing then their Kind is ; And contrary-wise Barren and not Generatiue. Also we make them differ in Colour, Shape, Actiuity, many wayes. We finde Meanes to make Commixtures and Copulations of diuerse Kindes ; which haue procuced many New Kindes, and them not Barren, as the generall Opinion is. We make a Number of Kindes, of Serpents, Wormes, Flies, Fishes, of Putrefaction ; Wherof some are aduanced (in effect) to be Perfect Creatures, like Beastes, or Birds ; And haue Sexes, and doe Propagate. Neither doe we this by Chance, but wee know before hand, of what Matter and Commixture, what Kinde of those Creatures will arise.

Wee haue also Particular Pooles, wher we make Trialls vpon Fishes, as we haue said before of Beasts, and Birds.

Wee haue also Places for Breed and Generation of those Kindes of Wormes, and Flies, which are of Speciall Vse ; Such as are with you your Silkwormes, and Bees.

I will not hold you long with recounting of our Brew-Howles, Bake-Howles, and Kitchens, wher are made diuerse Drinks, Breads, and Meats, Rare, and of speciall Effects. Wines we haue of Grapes ; And Drinkes of other Iuyce, of Fruits, of Graines, and of Rootes ; And of Mixtures with Honey, Sugar, Manna, and Fruits dried, and decocted : Also of the Teares or Woundings

dings, of Trees ; And of the Pulp of Canes. And these Drinckes are of severall Ages, some to the Age or Last of fourtie yeares. We haue Drincks also brewed with severall Herbs, and Roots, and Spices ; Yea with severall Fleshes, and White-Meates ; Wherof some of the Drinckes are such, as they are in effect Meat and Drinke both : So that Diuerse, especially in Age, doe desire to liue with them, with little or no Meate, or Bread. And about all wee strue to haue Drincks of Extreame Thin Parts, to insinuate into the Body, and yet without all Biting, Sharpenesse, or Fretting ; Inso-much as some of them, put vpon the Back of your Hand, will, with a little stay, passe through to the Palme, and yet taste Milde to the Mouth. Wee haue also VVaters, which we ripen in that fashien, as they become Nourishing ; So that they are indeed excellent Drinke ; And Many will vse no other. Breads we haue of severall Graines, Roots, and Kernells ; Yea and some of Fleth, and Fish, Dried ; With diuerse kindes of Leauennings, and Seasonings : So that some doe extremely moue Appetites ; Some doe Nourish so, as diuerse doe liue of them, without any other Meate ; Who liue very long. So for Meates, wee haue some of them so beaten, and made tender, and mortified, yet without all Corrupting, as a VVeake Heate of the Stomach will turne them into good Chylus ; As well as a Strong Heate would Meate otherwise prepared. We haue

some Meates also, and Breads, and Drinks, which taken by Men, enable them to Fast long after; And some other, that vsed make the very Flesh of Mens Bodies, sensibly, more Hard and Tough; And their Strength farre greater, then otherwise it would bee.

Wee haue Dispensatories, or Shops of Medicines. Wherin you may easely thinke, if we haue such Variety of Plants, and Liuing Creatures, more then you haue in Europe, (for we know what you haue,) the Simples, Druggs, and Ingredients of Medicines, must likewise be in so much the greater Variety. Wee haue them likewise of diuerse Ages, and long Fermentations. And for their Preparations, wee haue not onely all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heates, and Percolations through diuerse Strainers, yea and Substances; But also exact Formes of Composition, whereby they incorporate almost, as they were Naturall Simples.

Wee haue also diuerse Mechanicall Arts, which you haue not; And Stuffes made by them; As Papers, Linnen, Silks, Tissues; dainty VVorks of Feathers of wonderfull Lustre; excellent Dies, and many others: And Shops likewise, as well for such as are not brought into Vulgar vse amongst vs, as for those that are. For you must know, that of the Things before recited, many of them are growne into vse throughout the Kingdome; But yet,

yet, if they did flow from our Inuention, wee haue of them also for Patternes and Principalls.

Wee haue also Fournaces of great Diuerstities, and that keepe great Diuerstie of Heates: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Dry, Moist; And the like. But aboue all we haue Heates, in Imitation of the Sunnes and Heauenly Bodies Heates, that passe diuerse Inequalities, and (as it were) Orbs, Progresses, and Returnes, whereby we produce admirable effects. Besides wee haue Heates of Dunges; and of Bellies and Mawes of Liuing Creatures, and of their Blouds, and Bodies; and of Hayes and Herbs layd vp moist; of Lime vnquenched; and such like. Instruments also which generate Heate onely by Motion. And further, Places for Strong Insolations; And againe Places vnder the Earth, which by Nature, or Art, yeeld Heate. These diuerse Heates wee vse, As the Nature of the Operation, which wee intend, requireth.

Wee haue also Perspective-Houses, wher wee make Demonstrations of all Lights, and Radiations: And of all Colours: And out of Things vncoloured and Transparent, wee can represent vnto you all seuerall Colours; Not in Raine-Bowes, (as it is in Gemms, and Prisme,) but of themselues Single. Wee represent also all Multiplications of Light, which wee carry to great Distance, and make so Sharp, as to discerne small

Points and Lines. Also all Colourations of Light; All Delusions and Deceits of the Sight, in Figures, Magnitudes, Motions, Colours: All Demonstrations of Shadowes. Wee finde also diuerse Meanes yet vnknowne to you, of Producing of Light, originally, from diuerse Bodies. Wee procure meanes of Seeing Objects a-farr off; As in the Heauen, and Remote Places: And represent Things Neare as A-farr off; And Things A-farr off as Neare; Making Faigned Distances. Wee haue also Helps for the Sight, farr aboue Spectacles and Glasses in vse. Wee haue also Glasses and Meanes, to see Small and Minute Bodies, perfectly and distinctly; As the Shapes and Colours of Small Flies and Wormes, Graines and Flawes in Gemmes which cannot otherwise be seen, Observations in Vrine & Bloud not otherwise to be seen. Wee make Artificiall Raine-Bowes, Halos, and Circles about Light. Wee represent also all manner of Reflexions, Refractions, and Multiplications of Visuall Beames of Obiects.

Wee haue also Pretious Stones of all kindes, many of them of great Beauty, and to you vnknowne: Crystals likewise; And Glasses of diuerse kindes; And amongst them some of Mettals Vitrificated, and other Materialls, besides those of which you make Glasse. Also a Number of Fossiles, and Imperfect Mineralls, which you haue not. Likewise Loadstones of Prodigious Vertue: And other rare Stones, both Naturall, and Artificiall.

Wee

Wee haue also Sound-Houses, wher wee practise and demonstrate all Sounds, and their Generation. Wee haue Harmonies which you haue not, of Quarter-Sounds, and lesser Slides of Sounds. Diuerse Instruments of Musick likewise to you unknowne, some sweeter then any you haue; Together with Bells and Rings that are dainty and sweet. Wee represent Small Sounds as Great and Deepe; Likewise Great Sounds, Ixtenuate and Sharpe; Wee make diuerse Tremblings and Warblings of Sounds, which in their Originall are Entire. Wee represent and imitate all Articulate Sounds and Letters, and the Voices and Notes of Beasts and Birds. Wee haue certaine Helps, which sett to the Eare doe further the Hearing greatly. Wee haue also diuerse Strange and Artificiall Eccho's, Reflecting the Voice manytimes, and as it were Tosling it: And some that giue back the Voice Lower then it came, some Shriller, and some Deeper; Yea some rendring the Voice, Differing in the Letters or Articulate Sound, from that they receiue. Wee haue also meanes to conuey Sounds in Trunks and Pipes, in strange Lines, and Distances.

Wee haue also Perfume-Houses; wherwith we ioyne also Practises of Tast. Wee Multiply Smells, which may seeme strange. Wee Imitate Smells, making all Smells to breath out of other Mixtures then those that giue them. Wee make diuerse Imitations of Tast likewise, so that they

will deceyue any Mans Tast. And in this House wee containe also a Confiture-House, wher wee make all Sweet-Meats, Dry and Moist; And diuerse pleasant Wines, Milks, Broaths, and Sallets, farr in greater variety, then you haue.

Wee haue also Engine-Houses, wher are prepared Engines and Instruments for all Sorts of Motions. Ther we imitate and practise to make Swifter Motions, then any you haue, either out of your Musketts, or any Engine that you haue: And to Make them, and Multiply them more Easily, and with Small Force, by VVheelles, and other Meanes: And to make them Stronger, and more Violent, then yours are; Exceeding your greatest Cannons, and Basilisks. Wee represent also Ordnance and Instruments of VVarr, and Engines of all Kindes: And likewise New Mixtures and Compositions of Gun-Powder, Wilde-Fires burning in Water, and Vnquenchable. Also Fire-workes of all Variety, both for Pleasure, and Vse. Wee imitate also Flights of Birds; Wee haue some Degrees of Flying in the Ayre. Wee haue Shippes and Boates for Going vnder Water, and Brooking of Seas; Also Swimming-Girdles and Supporters. Wee haue diuers curious Clocks; And other like Motions of Returne: And some Perpetuall Motions. Wee imitate also Motions of Liuing Creatures, by Images, of Men, Beasts, Birds, Fishes, and Serpents. Wee haue also a great

great Number of other Various Motions, strange for Equality, Finenesse, and Subtilty.

Wee haue also a Mathematicall House, wher are represented all Instruments, as well of Geometry, as Astronomy, exquisitely made.

Wee haue also Houses of Deceits of the Senses; wher we represent all manner of Feates of Juggling, False Apparitions, Impostures, and Illusions; And their Fallaces. And surely you will easily beleene, that wee, that haue so many Things truly Naturall, which induce Admiration, could in a World of Particulars deceiue the Senses, if wee would disguise those Things, and labour to make them seeme more Miraculous. But wee doe hate all Impostures, and Lies: Insomuch as wee haue seuerely forbidden it to all our Fellowes, under paine of Ignominy and Fines, that they doe not shew any Naturall worke or Thing, Adorned or Swelling; but onely Pure as it is, and without all Affectation of Strangenesse.

These are (my Sonne) the Riches of Salomons House.

For the seuerall Employments and Offices of our Fellowes; Wee haue Twelue that Sayle into Forraine Countries, under the Names of other Nations, (for our owne wee conceale;) Who bring vs the Bookes, and Abstracts, and Patternes of Experiments of all other Parts.

These

These wee call Merchants of Light.

Wee haue Three that Collect the Experiments which are in all Bookes. These wee call Depredatours.

Wee haue Three that Collect the Experiments of all Mechanicall Arts; And also of Liberall Sciences; And also of Practises which are not Brought into Arts. These we call Mystery-Men.

Wee haue Three that try New Experiments, such as themselves thinke good. These wee call Pioners or Miners.

Wee haue Three that Drawe the Experiments of the Former Foure into Titles, and Tables, to giue the better light, for the drawing of Obseruations and Axiomes out of them. These wee call Compilers.

Wee haue Three that bend themselves, Looking into the Experiments of their Fellowes, and cast about how to draw out of them Things of Vse, and Practise for Mans life, and Knowledge, as well for VVorkes, as for Plaine Demonstration of Causes, Meanes of Naturall Diuinations, and the easie and cleare Discouery, of the Vertues and Parts of Bodies. These wee call Dowry-men or Benefactours.

*Then after diuerse Meetings and Consults of our whole Number, to consider of the former Labours and Collections, wee haue Three that take care, out of them, to Direct New Experiments, of a
Higher*

Higher Light, more Penetrating into Nature then the Former. These wee call Lamps.

Wee haue Three others that doe Execute the Experiments so Directed, and Report them. These wee call Inoculatours.

Lastly, wee haue Three that raise the former Discoueries by Experiments, into Greater Observations, Axiomes, and Aphorismes. These wee call Interpreters of Nature.

Wee haue also, as you must thinke, Nouices and Apprentices, that the Succession of the former Employed Men doe not faile; Besides, a great Number of Seruants and Attendants, Men and Women. And this we doe also: We haue Consultations, which of the Inuentions and Experiences, which wee haue discovered, shall be Published, and which not: And take all an Oath of Secrecy, for the Concealing of those which wee thinke fitt to keepe Secrett: Though some of those we doe reueale sometimes to the State, and some not.

For our Ordinances and Rites: Wee haue two very Long, and Faire Galleries: In one of these wee place Patternes and Samples of all manner of the more Rare and Excellent Inuentions: In the other wee place the Statua's of all Principall Inuentours. There wee haue the Statua of your Columbus, that discovered the

West-Indies : Also the Inuentour of Shippes : Your Monke that was the Inuentour of Ordnance, and of Gunpowder : The Inuentour of Musicke : The Inuentour of Letters : The Inuentour of Printing : The Inuentour of Observations of Astronomy : The Inuentour of Works in Metall : The Inuentour of Glasse : The Inuentour of Silke of the VVorme : The Inuentour of VVine : The Inuentour of Corne and Bread : The Inuentour of Sugars : And all these, by more certaine Tradition, then you haue. Then haue we diuerse Inuentours of our Owne, of Excellent VVorkes ; Which since you haue not seene, it were too long to make Descriptions of them ; And besides, in the right Understanding of those Descriptions, you might easily erre. For vpon euery Inuention of Valew, wee erect a Statuato the Inuentour, and giue him a Liberall and Honourable Reward. These Statua's are, some of Brasse ; some of Marble and Touchstone ; some of Cedar and other speciall VVoods guilt and adorned ; some of Iron ; some of Siluer ; some of Gold.

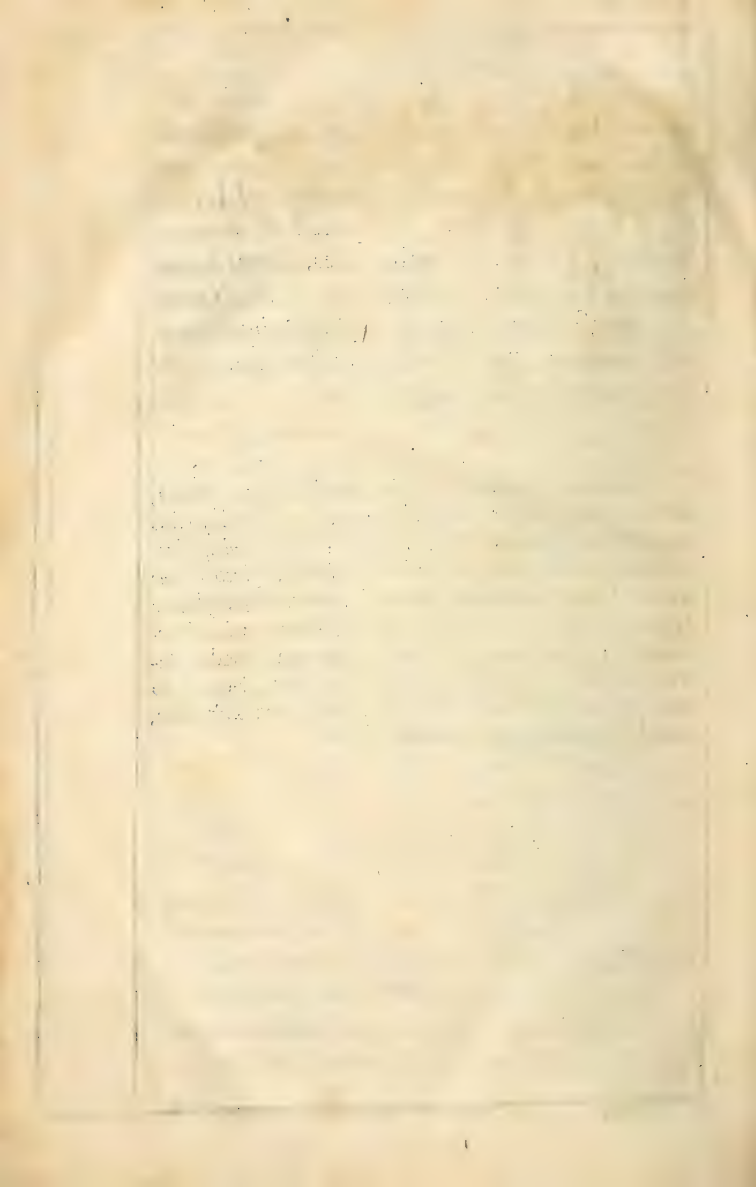
Wee haue certaine Hymnes and Seruices, which wee say dayly, of Laud and Thanks to GOD, for his Marueillous VVorks : And Formes of Prayers, imploring his Aide and Blessing, for the Illumination of our Labours, and the Turning of them into Good and Holy Vses.

Lastly, wee haue Circuites or Visits, of diuers Principall

Principall Cities of the Kingdome ; *wher, as it commeth to passe, we doe publish such New Profitable Inuentions, as wee thinke good. And wee doe also declare Naturall Diuinations of Diseases, Plagues, Swarmes of Hurtfull Creatures, Scarcety, Tempests, Earthquakes, Great Inundations, Cometts, Temperature of the Yeare, and diuerse other Things ; And wee giue Counsell thereupon, what the People shall doe, for the Preuention and Remedy of them.*

And when Hee had sayd this, Hee stood vp : And I, as I had beene taught, kneeled downe, and He layd his Right Hand vpon my Head, and said ; GOD *blesse thee, my Sonne ; And GOD blesse this Relation, which I haue made. I giue thee leaue to Publish it, for the Good of other Nations ; For wee here are in GODS Bosome, a Land vknowne.* And so hee left mee ; Hauing assigned a Vallew of about two Thousand Duckets, for a Bounty to mee and my Fellowes. For they giue great Largeesses, where they come, vpon all occasions.

The rest was not Perfected.





MAGNALIA NATVRÆ,
PRÆCIPVE QVOAD
VSVS HVMANOS.

T*He Prolongation of Life.*
The Restitution of Youth in some
Degree.
The Retardation of Age.
The Curing of Diseases counted
Incurable.

The Mitigation of Paine.

More Easie and lesse Loathsome Purgings.

The Encreasing of Strength and Actiuitie.

The Encreasing of Ability to suffer Torture or
Paine.

The Altering of Complexions : And Fatnesse,
and Leanness.

The Altering of Statures.

The Altering of Features.

The Encreasing and Exalting of the intellectuall
Parts.

Versions of Bodies into other Bodies.

Making of New Species.

Transplanting of one Species into another.

Instruments of Destruction, as of VVarre, and
Poyson.

Exhilaration of the Spirits; and Putting them in good Disposition.

Force of the Imagination, either upon another Body, or upon the Body it selfe.

Acceleration of Time in Maturations.

Acceleration of Time in Clarifications.

Acceleration of Putrefaction.

Acceleration of Decoction.

Acceleration of Germination.

Making Rich Composts for the Earth.

Impressions of the Aire, and Raising of Tempests.

Great Alteration; As in Induration, Emollition, &c.

Turning Crude and Watry Substances into Oily and Vnctious Substances.

Drawing of New Foodes out of Substances not now in Vse.

Making New Threds for Apparell; And New Stuffs; Such as are Paper, Glasse, &c.

Naturall Diuinations.

Deceptions of the Senses.

Greater Pleasures of the Senses.

Artificiall Mineralls and Cements.

FINIS.

